modern machine shop

FEATURES IN DRIEF

See Page 102

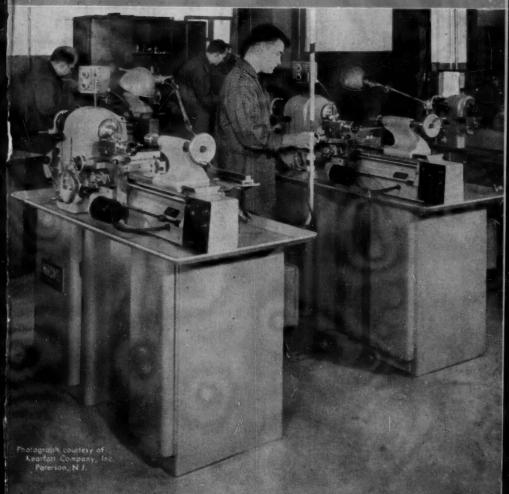
MACHINING AIRFRAMES

See Page 112

AUTOMATION

See Page 136

DECEMBER



Closer Tolerances Increase Demand for the HARDINGE Tool Room Lathe.



Now your problems in machining titanium can be considerably lessened with these valuable facts and figures tabulated from actual production runs by several of the East Coast's largest aircraft and engine producers.

Choice of ADAMAS carbide for these titanium jobs was determined through pre-testing against the grades of three other leading carbide producers. Against this stiff competition, ADAMAS outperformed all other grades by 4 or 5 to 1!

If you're already machining titanium or planning to, be sure to specify —

ADAMAS Grade BBfor improved performance in heavy roughing and scale cuts.

ADAMAS Grade B, the ideal grade for general machining and semi-roughing.

ADAMAS Grade Afor perfect finish turning and milling operations.

Since the proof of the carbide is in the cutting and not the advertising, don't read our claims—test them! Plan a test of ADAMAS' grades for titanium today!

TEST WITHOUT OBLIGATION! For an actual machine test or detailed titanium machining literature, contact: Technical Service Div., ADAMAS Carbide Corp., Dopt. 422, Kenilworth, N. J.

FEEDS AND SPEEDS FROM ADAMAS WILL HELP END YOUR DIFFICULTIES!

ADAMAS RECOMMENDED FEEDS AND SPEEDS for machining TITANIUM ALLOYS*

(For machining commercially pure titanium, type TI-75A, double speeds.)

	Scaly Forgings	No scale rami- roughing	Finish turning, boring & facing	Milling
Grade of Carbide	ADAMAS Grade BB†	ADAMAS Grade II	ADAMAS Grade A	ADAMAS Grade A
SFPM	50	150 - 200	300	350
Feed	.010020	.010020	005 .010	.003 per tooth
Bepth of Cut	250 - 500	250	015 032	

HELPFUL "TIPS"

Hew To Eliminate Vibration

To end tool vibration, use as large a shank size as possible on the tool. For severe roughing or scaly cuts use a high lead angle. Another "lip" is to hone a 45" land on the cutting edge approximately 005" to 010" wide . . . or reduce feed.

What To Do About Scale or Oxide

In machining titanium forgings covered with scale or axide, use as large a radius as possible on your tool. This radius, however, must be kept below the point where vibration will be encountered.

* These figures represent approximate starting points and should be odjusted to your own machines and set up conditions.
† Figures on ADAMAS Grade 88 represent a rough face front flange operation of 682 Titanium Alloy on a Bullard VTL machine. The

operation of 682 Titanium Alloy on a Bullard VTL machine. The size of the malerial was: Diemoter—17 7/5," Length of cut—5"

Diameter—17½" Length of cut—5"

ADAMAS Grade BB delivered 12-15 pieces per grind. Figures on Grades A & 8 ovaliable upon request.



ADAMAS

CARBIDE CORPORATION KENILWORTH, NEW JERSEY

Producers of tungsten carbide tools, tool tips, dies, wear parts, Dex-A-Tool and Ceralox.

For more data circle "Second Cover" on Reader Service Card

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modern machine shop

DECEMBER 1 9 5 6

Vol. 29 No. 7

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Member

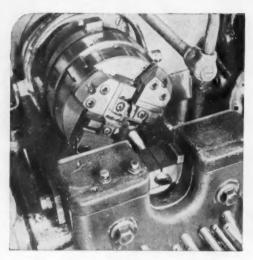




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Accepted as controlled circulation publication at Cincinnati, Ohio.

(For more information on cover advertisements, use Reader Service Cards opposite pages 32 and 372.)



BOLTS

threaded to ± .001

on a Landmaco Machine

Using LANDIS Threading Equipment, the Chicago Screw Company of Bellwood, Illinois, is able to thread connecting rod bolts to better than Class 4 fit at normal production rates and economical tool cost.

Bolt blanks are of 8640 steel of 30-36 Rockwell "C" hardness. 11/16" diameter 16 pitch UN form threads must be cut 1-7/16" long over a cotter key hole. Specifications required a ± .001" tolerance on the Pitch Diameter of the thread, and finished threads are closely inspected for concentricity.

To perform this operation a 1½" LANDMACO Double-Spindle Threading Machine equipped with Leadscrew, Hardened and Ground LANCO Heads, and Chasers of special throat length and hardness was installed. In normal production, this LANDMACO Machine regularly completes 127 threaded pieces per hour cutting at 15 surface feet per minute. On an average 400 threads per head are produced between

each regrinding of the chasers.

This installation illustrates the production advantages of LANDIS Equipment for difficult and exacting threading operations. The mechanically - controlled positive feed of the Leadscrew, the maximum rigidity of Die Heads designed for precision threading, and Chasers of special specifications—allow threading hard material with minimum cutting strain. As a result, threads are produced to close tolerances at economical production rates and low tool cost.

For further information, ask for Bulletin H-75 (LANDMACO Machines) and F-80 (Hardened and Ground Heads). Please send specifications when writing.

388-MC

LANDIS Machine CO. WAYNESBORD PENNA, U.S.A.

For more data circle 201 on Reader Service Card

DUSKOLECTORS



CYCLONE

Your plant produces dust in a surprising number of locations. By collecting it at the source you:

- Provide healthier working conditions
- Protect costly machines
- Reduce cleaning and painting costs

Hammond Duskolectors don't cost—they pay!

Clip this page to your letterhead. Duskolector catalog with helpful engineering information and interesting installation views will be sent at once.

Hammond Machinery Builders

1615 DOUGLAS AVENUE

KALAMATOO MICHIGAN

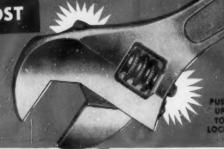
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EXTRA VALUE AT NO EXTRA COST

TO UNLOCK

THE EXCLUSIVE PATENTED LOCKING FEATURE ...

of Williams new "push-button" adjustable wrench is typical of the extra value you get in Williams tools . . . and, they are so easy to get through your local distributor.





ALLOY "SUPERRENCHES"

Over 30 patterns in 386 sizes from %" to 3%" openings.



CARBON WRENCHES

Over 30 patterns in 581 sizes with openings from 36" to 75%".



"SUPERSOCKETS"

14, 36, 12, 34, 1" Square Drives. Openings from 36" to 316".



POWER IMPACT SOCKETS

For all power and impact wrenches. Seven square drives $\frac{1}{4}$ " to $\frac{1}{4}$ ". Hex and square openings $\frac{3}{4}$ " to $\frac{3}{2}$ ".



TOOL HOLDERS AND SET-UP ACCESSORIES

A complete range of tool holders, lathe dogs, cutters, T-slot bolts and nuts, wedges; washers and strap clamps.



DROP-FORGED C CLAMPS

General and heavy service, Deep throat standard and spatter-resisting, Tool makers', and Machinists'.



HOIST HOOKS AND EYE BOLTS

Proof-tested Hoist Hooks, shank and eye patterns, $\frac{1}{2}$ to 30 Ton capacities. Eye Bolts, plain and shoulder patterns, blank or threaded.



PIPE TONGS AND VISES

Tongs — 4 styles — 1/4 to 18" pipe capacities.
Vises — 2 styles — 1/4 to 8" pipe capacities.

PLUS Thumb nuts and screws, machine handles, rod ends, flange jacks, screw drivers, pliers, soft-face and ball pein hammers, punches, chisels, pullers, feeler gauges, body and fender tools, masonry bits, screw extractors, auger bits.



"THE BROADEST LINE OF ITS KIND"

Write for Catalog 302

J. H. WILLIAMS & CO.

410 Vulcan Street, Buffalo 7 New York

For more data circle 203 on Reader Service Card

How a STANDARD* Plain Internal Grinder SAVED IDLE MACHINE TIME

Heald Model 271 does a month's production ALL IN A DAY'S WORK ... and can do many other jobs in its "spare time" The race is not always to the swift. For example: An aircraft manufacturer requested a quotation on a Model 271 Size-Matic for grinding three double bores in a bearing housing. Production requirements — 25 parts per month. A high-speed Size-Matic would do the whole job in less than a day — and be idle the rest of the time. So Heald engineers recommended a Model 271 Plain Internal instead. This semi-automatic machine could still do the whole month's production in one day — yet because of its inherent versatility, the standard Plain machine could be used for many other internal grinding jobs in its "spare time".

This solution to the problem not only saved on the initial investment, but avoided idle machine time and

contributed to greater productivity and lower costs. The 271 Plain Internal, and the job for which it was ordered, are shown below. For the best answer to any precision finishing problem . . . It PAYS to come to HEALD



* Send for Bulletin 2-2569-1, Issue 1.



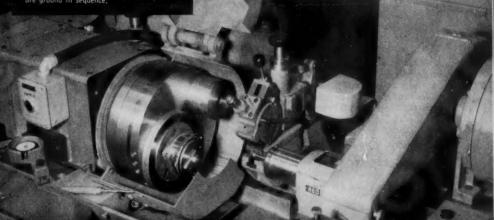
Part drawing of bearing housing showing 3double bores ground on Model 271 Plain Internal below. The two bores at each location are ground in sequence.

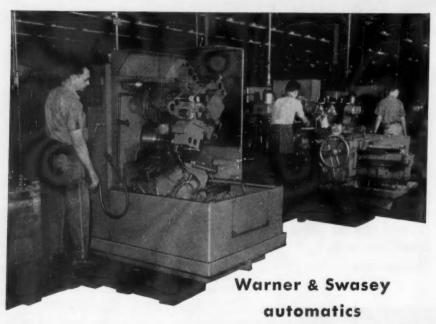
THE HEALD MACHINE COMPANY

Subsidiary of The Cincinnati Milling Machine Co.

Worcester 6, Massachusetts

Chicago · Cleveland · Dayton · Detroit · Indianapolis · New York





slash machining time on 50 to 350 piece lots

THE YALE & TOWNE MANUFACTURING COMPANY, Philadelphia, machine 64,000 different parts, on a two-month cycle, for their five models of industrial lift trucks. They installed two Warner & Swasey 2 AC Single Spindle Automatics to step up production on a wide variety of small lot parts. Lot sizes range from 50 to 350 pieces.

They quickly realized the expected production increase, plus more efficient use of manpower, since one operator can easily handle both automatics.

They selected Warner & Swasey 2 AC's for the job because these machines give them the advantage of automatic production without the usual penalties of greatly increased setup time. Their setup time is just a small fraction more than on turret lathes.

"Another big advantage we had not fully anticipated," they report, "is the interchangeability of tools. The very accessible tooling area and the use of many standard turret lathe tools are valuable features of these automatics."

There are undoubtedly many small lot, "turret lathe" jobs in your own plant that could be machined faster, more profitably and with extreme accuracy on Warner &

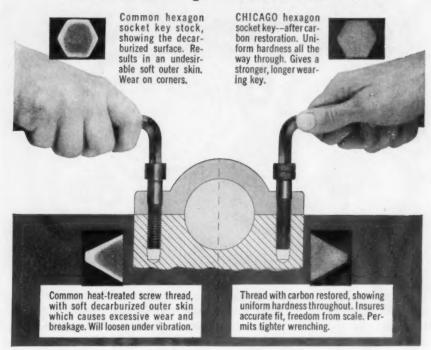
Swasey Single Spindle Automatics. Have your Warner & Swasey Field Representative show you how these machines' flexibility and fast setup can pay off for you.



YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS ... WITH A WARNER & SWASEY

For more data circle 205 on Reader Service Card

How carbon affects fastener performance



Screw fasteners may look identical, but the microscope reveals wide differences in their ability to "take it".

Steel hardness depends on the precise amount of carbon in its structure. But during steel manufacture this vital surface carbon is inevitably lost. Result (shown above) is a soft, decarburized outer skin in the finished fastener, causing thread stripping, fatigue failure, excessive wear, or loosening under vibration.

The soft "decarb" layer is eliminated

by The Chicago Screw Company's unique "Carbon Restoration" process in which surface carbon is replaced during heat treating. The process is precisely controlled to give uniform hardness from core to surface.

All Chicago "Safety-Plus" Socket Screw Products and heat-treated cap screws have the benefit of *Carbon Res*toration plus complete quality control from start to finish. For full information and catalog, write our Standard Products Division.

THE CHICAGO SCREW COMPANY

DIVISION OF STANDARD SCREW COMPANY • ESTABLISHED 1872 2803 WASHINGTON BOULEVARD, BELLWOOD, ILLINOIS

For more data circle 206 on Reader Service Card

Versatility Includes automatic Milling



AUTOMATIC RECIPROCATING FEED CYCLE

Automatic reciprocal milling setups, with center safety stop, may be assigned to Automatic Cycle Machines. That's because automatic backlash eliminator is a standard feature.

A high production two-fixture setup on a CINCINNATI No. 2MI Plain Automatic Cycle Milling Machine.

Here's a way to turn in a better cost performance record when you have high production milling jobs sandwiched in between toolroom quantity lots. Just assign all of them to a machine equipped for both high production and toolroom milling. ¶ In the 3 and 5 hp class, CINCINNATI® ML and MI Automatic Cycle Milling Machines will give you the best cost performance record you've ever seen. You can use

the automatic table cycles or not, as desired. And for extra high production setups, like the one illustrated here with a fixture at each end of the table, you'll appreciate a cincinnati more than ever because of these two advantages:

- 1) Automatic backlash eliminator
- 2) Center safety stop

Both are standard features of the





ML and MI Automatic Cycle Milling Machines. And for a little extra you can also have automatic spindle stop. These automatic features in no way affect the versatility of the ML's and MI's for small quantity production. You can see why if you will write for catalog No. M-1916-1. Brief data contained in Sweet's machine tool file.

THE CINCINNATI MILLING MACHINE CO. CINCINNATI 9, OHIO



CINCINNATI No. 2Ml Plain Milling Machine. Complete specifications may be obtained by writing for catalog No. M-1916-1.

MILLING MACHINES • BROACHING MACHINES • CUTTER AND TOOL GRINDERS • METAL FORMING MACHINES HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID • GRINDING WHEELS

For more data circle 208 on Reader Service Card

Speed Precision Boring and maintain accuracy of .0002" in 12" with the

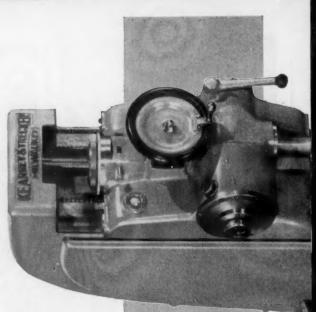
Kearney & Trecker
Model B Autometric
Precision Boring Machine

Here it is... unmatched for precision boring of small work... either single pieces or production lots! Work progresses rapidly on the versatile Model B because multiple boring operations can be completed in just one setup. These additional features save time, eliminate errors, and make the rugged Model B easy to operate...

Convenient operating controls . Ease of control

• Ease of setup • Built-in index table and measuring instruments • Wide range of feeds and speeds

 Complete line of especially selected accessories.

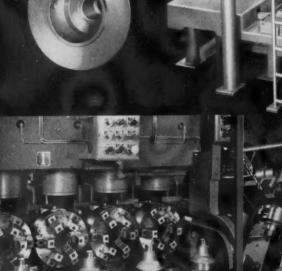


Model B Autometric: 16" dia.
Travel: 10" Vert.
Travel: 16" Transverse Travel: 15"
Carriage Travel: 8 speed changes—
0005" to .0148"
per Spindle rev.; 50 to 2500 rpm.
For complete details, contact your nearest K e ar ne y & Trecker distributor, or write K e ar ne y & Trecker Corp., 6794 W. National Ave., Milwaukee 14, Wis. Ask for Catalog No.

Designers and Builders of Precision and Production Machine Tools Since 1898

For more data circle 210 on Reader Service Card

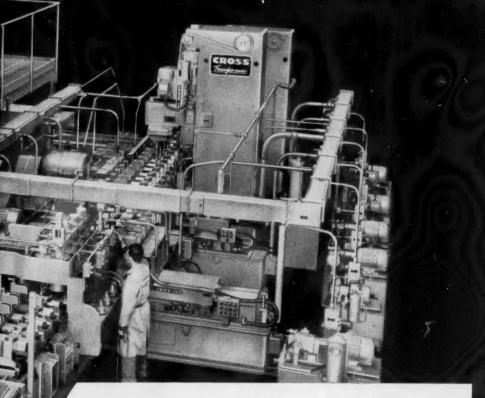
Announcing the NEW Cross Chucking Transfer-matic



Station 1

Station 4

Another Automation First by Cross



A completely new development! That's the Cross Chucking Transfer-matic... the first chucker ever built on this principle. Standard Cross "building block" construction makes provision for any reasonable number of stations and work pieces up to 48" in diameter.

This particular seven station Transfer-Matic, created for differential gear cases, has a rated capacity of 368 pieces per hour at 100% efficiency.

An unusual feature is that the work pieces are chucked and not released until all operations are complete. The chucks are mounted on precision spindles, which in turn are carried on pallets—four to the pallet. There are ten pallets—one at each station and three on the conveyor moving from Station 7 to Station 1.

Operations are: Station 1, four pieces positioned in work holding chucks by loading mechanism and clamped automatically. Station 2, pilot diameters turned and side gear pockets bored. Station 3, spherical seats generated. Station 4, flange faces and thrust faces for side gears generated. Station 5, pin hole for pinion shaft drilled after spindles are indexed into pre-determined position and locked to prevent rotation. Station 6, pin hole chamfered top and bottom. Station 7, pin hole rough and finish reamed with shuttle head.

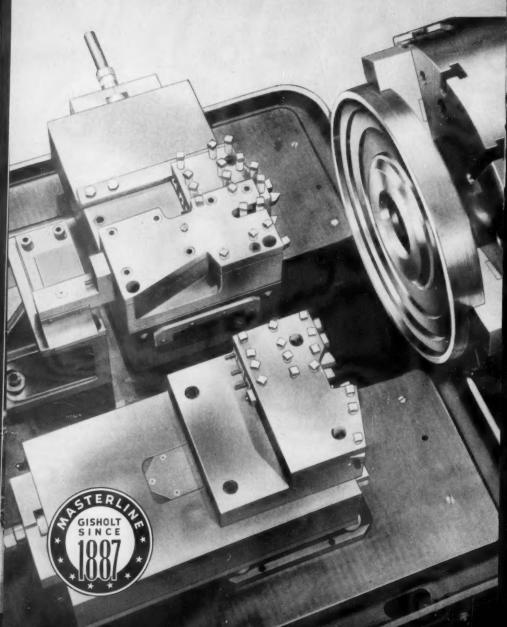
Features include construction to JIC Standards, hardened and ground ways, interchangeability of all parts, pre-set tooling and programmed tool changes with the Cross Machine Control Unit.

Setublished 1808

THE CROSS CO. First in Automation

DETROIT 7, MICHIGAN

This New GISHOLT MASTERLINE SIMPLIMATIC AUTOMATIC LATHE may save you



the cost of a special machine



HERE'S WHY: the machine itself—headstock, bed, extra wide platen table—is standard!

Yet with the new Gisholt MASTERLINE Simplimatic Automatic Lathe, you have ample space for an *infinite* number of slide and tool arrangements. You can use front, center, rear and auxiliary slides—all moving at different feed rates—carrying enough tools to machine a maximum number of surfaces in a single chucking. All slides are easily mounted at correct angle to the work—keeping tool overhang to absolute minimum for increased rigidity and increased accuracy. And with the Simplimatic's table feed, tools can engage with the work or perform additional machining operations before actual slide movements begin.

Because the Gisholt Simplimatic is a standard machine, it is easy to set up, operate and maintain. In many cases, the automatic cycle frees the operator to handle additional units or perform other work. And the basic design is readily adapted for work-handling devices, which even further simplify the operator's job and speed production!

Ask your Gisholt Representative to show you how efficiently the Simplimatic can handle your problem parts—using a simple, standard machine transformed by addition of standard tool slides, tool blocks and chucking equipment—performing special machine functions at standard machine prices! Call him today for full information on the Simplimatic!





Simplimatic setup for machining both ends of tractor rear axle housings in one chucking. Four tool slides are used, two at the front and two at the rear of the platen table. Machining includes turning and chamfering, forming and straddle-facing, with tool relief provided for facing tools on the rear tool blocks. Six different sizes of tough steel oil well cutter bits are handled easily, efficiently by this setup. All slides and tools are placed at correct angle to the work. Tools are mounted on riser plates, permitting pre-setting for quick change-over and adjustment. Rigid support prevents chatter on heavy forming cuts.

READY NOW! Write today for new Catalog 1159-A on Gisholt MASTERLINE Simplimatic Automatic Lathe. Fully illustrated shows 31 typical jobs.



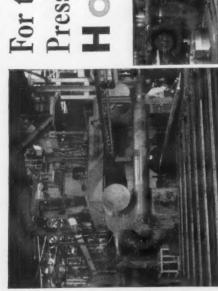


G SMACHINE COMPANY

Madison 10, Wisconsin, U.S.A.

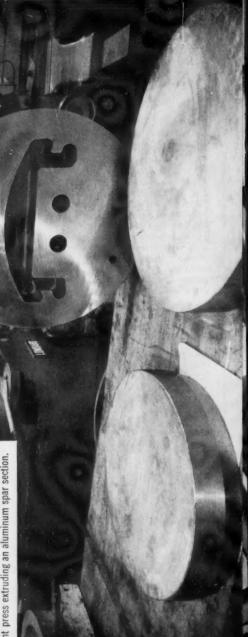
TURRET LATHES - AUTOMATIC LATHES - SUPERFINISHERS - BALANCEES - PACKAGING MACHINES - MOLDED FINERGLAS PLASTICS

For more data circle 214 on Reader Service Card



Giant press extruding an aluminum spar section.

Presses ... it's FIRTH STERLING For the King and Queen of Extrusion HOT WORK DIE STEEL





2500 lb. die blanks and a finished extrusion die of Firth Sterling HWD Hot Work Die Steel.

At Kaiser Aluminum & Chemical Corporation's Halethorpe Extrusion Works, operated under a U. S. Air Force lease, are two 8,000 ton capacity extrusion presses—the largest operating units designed and built in the United States. Presently extruding large, complex aluminum shapes—wing spars, wing panel sections, and missile hull sections, for the aircraft industry, the two giant presses, named Rex and Regina, utilize dies made from Firth Sterling Hot Work Die Steel.

Yes, Firth Sterling HWD is a monarch in its own right, with properties capable of withstanding the tremendous pressures of this king and queen of extrusion presses. This intricate process

requires materials that can operate continuously in volume production without replacement. These giant presses each weigh 1500 tons and are capable of extruding aluminum shapes more than 85 feet long and over 1200 pounds each in weight. The use of Firth Sterling HWD is tangible evidence of the high opinion modern die makers have of the quality of the material.

HWD Steel is just one of the Firth Sterling line of more than 50 Tool and Die Steels. Ask for a Firth Sterling engineer to cooperate in your next die making problem to assure the correct grade and analysis.

Fieth Sterling

GENERAL OFFICES: 3113 FORBES ST., PITTSBURGH 30, PA.

MILLS MCKEESPORT, TRAFFORD, DETROIT, HOUSTON, HARTFORD

OFFICES AND WAREHOUSES* BIRMINGHAM CHICAGO* CLEVELAND* DAYTON DETROIT* HARTFORD*

HOUSTON* LOS ANGELES* PITTSBURGH WESTFIELD, N.J.

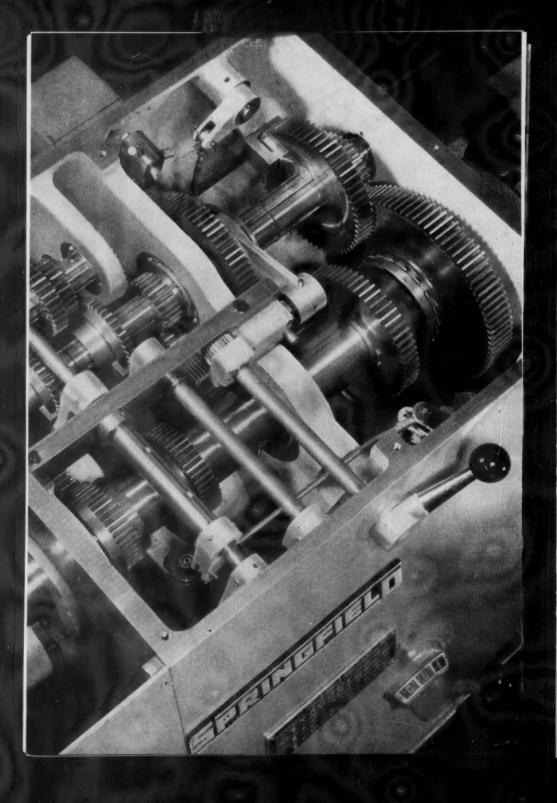
PRODUCTS OF FIRTH STERLING METALLURGY
High Speed Steels Steels Sintered Tungston Carbides

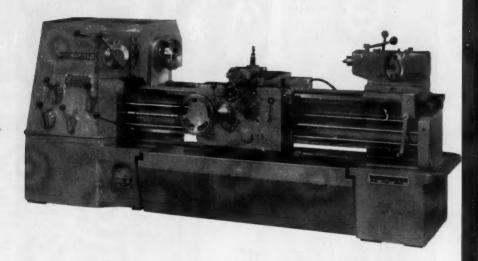
infess Specialties

Temperature Alloys

High Temperature Cermels

For more data circle 216 on Reader Service Card





more useful horsepower

All the horsepower in a Springfield Model "S" Lathe is productive.

A simple, straight-forward gear train, plus double-action lubrication, plus tight dynamic balance tolerances (.0005" displacement) eliminate friction and vibration, the twin horsepower thieves.

In the headstock, only the gears necessary to a given speed are engaged. Other gears run free with a stabilizing flywheel action, no drag on power.

A high pressure filtered oil mist keeps all gears and bearings drenched, and a cascade of oil lubricates the feed box.

Lathes: Engine and tool room, contouring and reproducing—swings 14" to 32". Vertical Universal Grinders: swings 18" to 42".

The Springfield Machine Tool Company Springfield, Obio SPRINGFIELD

we're getting TOP management performance of formance

from our

BULLARD

H.B.M. Model 75

GAS CYUNDER CASTING



20

"The acquisition of our Bullard HBM, Model 75 has eliminated a production bottleneck by giving us a reliable machine to handle our output" says Mr. Frank A. Kocevar, Chief Industrial Engineer at The Joy Manufacturing Co., of Michigan City, Indiana, manufacturers of portable and stationary compressors for industry.

This "built-in reliability" of the Bullard HBM, Model 75 can be applied to your boring, milling, drilling and facing problems — check its outstanding features by calling your nearest Bullard Sales Office or Distributor or for a complete catalog, write to —

THE BULLARD COMPANY BRIDGEPORT 9, CONNECTICUT

For more data circle 219 on Reader Service Card

Production turning at 1/2 the cost!

FEATURE	Lodge & Shipley 10" HI-TURN	Lathe B	Lathe C
HEADSTOCK			
Full 5 horsepower	yes		
200 to 3000 r.p.m.	yes		
All spur gear drive	yes		
Swing over bed	131/4"		
Spindle speeds	9		
BED			
Width of bed	11%"	1	
Depth of bed	115/16"		
Hardened, ground, replaceable bedways	yes		
QUICK CHANGE GEAR	BOX		
Number of quick change	e feeds 9	1	
Range of Feeds, thous. p	er rev. 1.5	to 24	
CARRIAGE			
Carriage length	191/8	"	
Carriage bridge width	57/8"		
Cross slide travel	63/4"		
Flame-hardened and groun cross slide ways	d yes		
TAILSTOCK			
Tailstock spindle diameter	21/8"	1	
Tailstock spindle travel	41/2"	1	
MISCELLANEOUS		1	1
Size of lathe tool	3/4" x 3/4"		
Net weight, base machine	3400 lbs.		
emplate type length stops	yes		

Your Lodge-ical Choice for low-cost high-production

odge & Shipley

Lodge & Shipley 10" HI-TURN Production Lathe does job of really big lathe

. . . and completely outperforms any other 10" lathe!

BIG in power and production . . . BIG in speed, in rugged construction and accuracy, the Lodge & Shipley 10" HI-TURN Production Lathe costs only ½ the price of a good 13" lathe used for comparable work.

Here are a few of the many features that put the 10" HI-TURN in the big lathe, big value class and put it way ahead of any 10" lathe:

You make the comparison

with <u>any</u> 10" Lathe!



Compare the Lodge & Shipley 10" HI-TURN Production Lathe with any other 10" lathe . . . even with 13" lathes. If you don't need additional thread chasing facilities, it's the lathe for you!

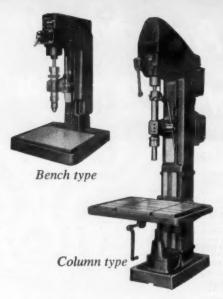
Get complete details now. Write: The Lodge & Shipley Co., 3055 Colerain Ave., Cincinnati 25, Ohio.

For more data circle 220 on Reader Service C

The many features of our standard drilling and tapping machines can be combined in more than 100,000 different ways—and one of those combinations exactly meets your requirements.

Capacities in cast iron from very small numbered drills to 2"; No. 32 Jacobs chuck to No. 4 Morse taper.

Six or 8 speeds up to 12,000 rpm; 4 feeds.



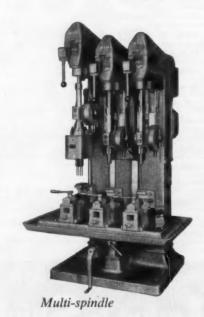
Avey has the right one

Column or bench type, with wide range of swing, 1 to 8 spindles.

All of our standard drilling and tapping machines include such bonus features as micrometer stop collar, telescoping spindle guard, dynamicallybalanced rotating parts, rack-and-pinion-operated motor plate, and our rugged, involute spindle construction.

Tool and die shops like the versatility, accuracy, and speed of our Tool Room machines. They're available with No. 2, 3, or 4 Morse taper. You select the table you need: large (34" x 25"), round (18" diameter), or compound (25" x 12").

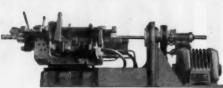
Ask for our literature; or, better yet, ask our representative to help you select the pay-off combination.







drilling, tapping, production machines



Avey-draulic

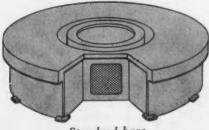
Sharp reductions in unit costs, floor space, machine-handling time, and operating time often make our high-production machines smart investments with fast pay-off periods. They have repeatedly proved this in some of the finest automatic lines in the country.

Our standard units can be combined for either rotary or linear operations. They can be economically re-engi-

for Avey makes them all



Indexing table



Standard base

neered for successive jobs.

Automatic cam feed units, for drilling, tapping, reaming, hollow milling. Vee belt or gear drive. No. 1, 2, or 3 Morse taper. Mount at any angle. Fully or semi-automatic. Tamper-proof.

Avey-draulic feed unit. Automatic withdrawal for chip removal only when necessary during deep hole drilling. Rapid advance, feed, and rapid return. Standard strokes 12" up to 30."

Automatic index tables. Rapid, accurate indexing to .001", 3 to 100 stations. Even or uneven index patterns. 16" to 48" diameter.

Steel bases. Stress relieved, sandblasted, machined, and painted to fit your application.

Send us a print of your part, and ask for a profit prediction.

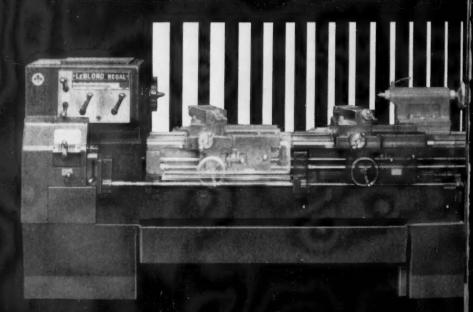
THE AVEY DRILLING MACHINE COMPANY
CINCINNATI 1, OHIO

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Capacity on a sliding scale

New LeBlond Sliding Bed Gap



Also available... New Plain Gap Regal

Greatly increased swing size to accommodate work with flanges up to 35 inches in diameter. Also performs all normal lathe operations, including close-to-the-face-plate facing.





With the LeBlond Sliding Bed Gap lathe you break out of "small lathe" limitations—enjoy added capacity and versatility normally available only in much larger, more expensive lathes. On the Regal 17"/28" SBG, the upper bed slides away from the headstock, quickly converting a 17" lathe to a 28". Up to 35 inches of swing is provided for work with large flanges or eccentric projections. Center distance increased over 50% with the bed extended.

For the maintenance or job shop encountering workpieces of widely varied size and shape, the Regal Sliding Bed Gap lathe offers the ideal, low-cost answer.

Regal performance matches its increased capacity, too. The new 12-speed, gear-belt headstock with its 3-bearing spindle delivers power with precision. The extra wide carriage bridge, riding on hardened and ground steel bed ways, gives staunch tool support. 56 speeds or threads can be selected with the foolproof, self-lubricating quick-change box. Separate feed rod and leadscrew guarantee continued thread chasing accuracy.

Regal Sliding Bed Gap Lathes can give you the double advantage of a regular engine lathe *plus* a special purpose machine tool. Also available in 19"/28" size. Put them to work for you. See your LeBlond Distributor or write.

... cut with confidence



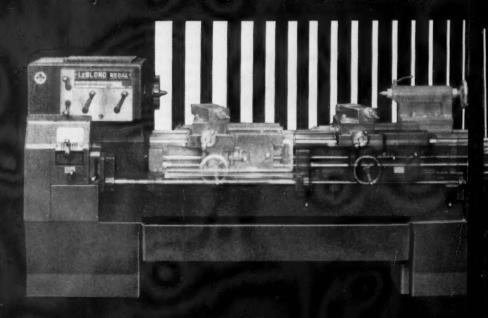
THE R. K. LEBLOND MACHINE TOOL COMPANY
CINCINNATI 8. OHIO

World's Largest Builder of a Complete Line of Lathes for More than 70 Years



Capacity on a sliding scale

New LeBlond Sliding Bed Gap



Also available... New Plain Gap Regal

Greatly increased swing size to accommodate work with flanges up to 35 inches in diameter. Also performs all normal lathe operations, including close-to-the-face-plate facing.





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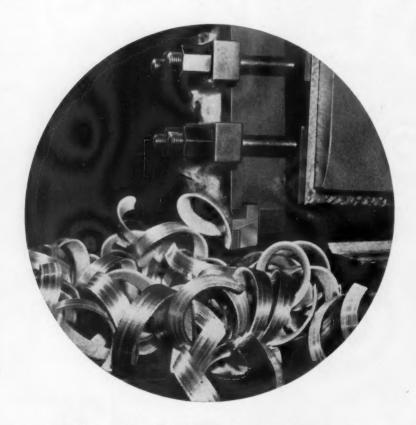
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World's Largest Builder of a Complete Line of Lathes for More than 70 Years

speeds for carbides plus heavy-cut efficiency



low range to 100 fpm . . . for extreme depths of cut and maximum feeds

medium range to 150 fpm . . . for average cuts in medium steel or cast iron
high range to 300 fpm . . . for carbide planing of steel and non-ferrous metals

with triple circuit h3 drive

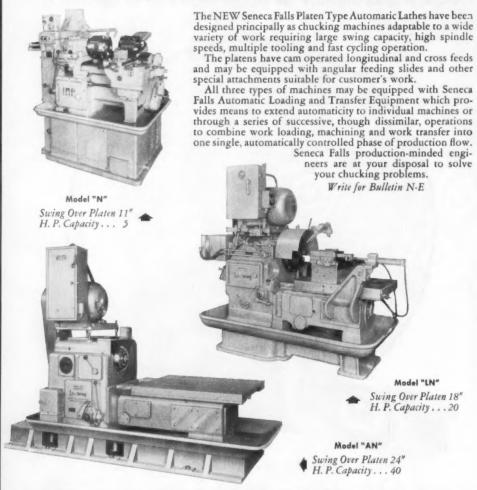


ROCKFORD MACHINE TOOL CO.



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NEW PLATEN-TYPE AUTOMATIC LATHES CUT BORING, FACING AND TURNING COSTS



SENECA FALLS PLATEN-TYPE, CAM-OPERATED AUTOMATIC LATHES

For more data circle 227 on Reader Service Card

28



This Apex "2-in-1" spring-loaded impact socket is used interchangeably to run down 34" and 76" hex nuts on automobile engines. It eliminates constant changing of tools, helps step up production.



This Apex Spanner-type socket has four internal driving lugs to engage the four openings in the flange-type nut. It eliminates the customary external prongs that frequently break off and slow down assembly operations.



The true cost of any tool will show up in production records, not just on the price tag. The amount of work a tool can do efficiently is far more important than the original tool cost.

For example, each of these special Apex sockets was designed to solve an unusual fastening problem. For this reason alone, these tools have proved well worth their original price. In addition, these tools have provided substantial savings in production time and expense—that's why the true cost of Apex tools is always lower.

Apex—the authority on fastening—offers creative engineering and specialized manufacturing experience that will help solve your fastening problem. Our new Pocket Catalog is ready — may we send you a copy?

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for the answer to your fastening problem!

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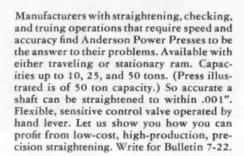
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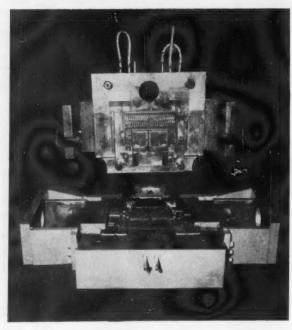
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Your many demands for a high-speed light-duty radial are met—completely and economically—by this new Gilbert 3 hp machine. Compare its new features with other radials of equal capacity, and you see why the Gilbert is the best buy in its class. Traditional Gilbert accuracy, fast re-

sponse, and wide-angle work visibility make your shop more productive, more versatile. Variety of bases, runway mounting, or tables available. Get all the details in Bulletin 255.

The Cincinnati Gilbert Machine Tool Co. 3340 Beekman Street, Cincinnati 23, Ohio

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No matter what your DIE-CASTING JOB may be ...

Accuracy calls for **POTOMAC M Hot Work Die Steel**



Write for BLUE SHEET on POTOMAC M

This concise four-page folder gives all needed handling and shop treatment details on Potomac M. Included is certified laboratory information on physical characteristics, and complete data on forging, annealing, hardening, tempering, etc. Ask for your copy.

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In the precision casting of aluminum, POTOMAC M Hot-Work Die Steel is especially favored as the material for die-casting dies because its properties help assure accuracy of the steel itself after heat treatment. Die makers have found that size changes are held to a minimum. Dimensional stability is thus the first contribution that POTO-MAC M makes to accuracy.

Production accuracy of the die after it is in service is maintained also by the

resistance of POTOMAC M to wear, to heat checking, and to metal wash.

Allegheny Ludium makes a complete line of steels for hot-work tooling of various kinds-so, whether your need is the mass producing of duplicate parts or fabricating a few of them, call up or write "A-L" every time for hot-work counsel or service or both. Just tell us your requirements.

· Allegheny Ludlum Steel Corporation, Henry W. Oliver Bldg., Pittsburgh 22, Pa.

For nearest representative, consult Yellow Section of your telephone book.

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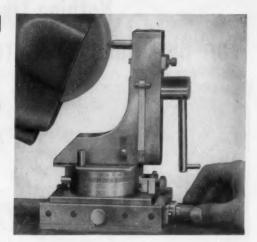
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dress two angles tangent to a radius in one continuous motion



With the unique "Fluidmotion"

Dresser, you can dress two angles tangent to a radius — using one handle in one continuous motion.

Operation is so fast and simple that beginners can use them.

Adaptable to all type cylindrical and surface grinders.

- A. Obtain micrometer reading; add required convex radius or subtract required concave radius.
- B. Loosen jib with wrench and "mike" over lower pins to reading obtained above.
- C. Tighten jib. Set stops for two angles. Ready for action.



Also available: "FORM MASTER" Dresser, capable of dressing any radii up to 12" convex, up to 15" concave. Prices start at

See your industrial distributor or write for free literature.



JAW CLAMPS + PRECISION VISES + BOWN-HOLBING DEVICES

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- Fast-starting statically and dynamically balanced motor!
- Solid housing of pressure die cast aluminum!
- Pedestal base for extra convenience
 . . . Illuminated or plain eye shield
 —all optional at small extra cost.

SKIL 6" BENCH GRINDER

Ordinarily you find features like these only on larger, more expensive bench grinders! Wheel guards with end covers, spark arrestors and exhaust chutes give extra safety. Flat face design permits easier handling, lets you reach hard-to-get-at surfaces. For grinding, sharpening, brushing, or buffing—in all production and maintenance.



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General-Purpose Sawing

with
High Speed
Accuracy, Economy



Let us prove to you the many reasons why this MARVEL Hack Saw offers the cheapest, most accurate and fastest "cutoff" method available to you at a low initial cost.

Ask your dealer, or write us for Bulletin GP35 which fully describes and illustrates the many exclusive features which makes this Hack Saw Machine your "best buy".

MARVEL No. 4B HIGH SPEED HACK SAW Exclusive features

- 1. Horizontal Ball Bearing Saw Frame.
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- Quick Return Stroke—allows greater number of strokes per minute.
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December, 1956

modern machine shop

35



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BURRING, CLEANING, FINISHING, POLISHING-IN ONE OPERATION



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Readily available, multi-use Brightboy STOCK grains and textures are JOB-MATCHED to your work. In many instances they completely eliminate the expense and delay of ordering "specials".

Choose from the wide range of Brightboy abrasive grains in Silicon Carbide and Aluminum Oxide. Grains and textures range from extra fine to extra coarse—ALL in soft, firm and tough rubber binders.



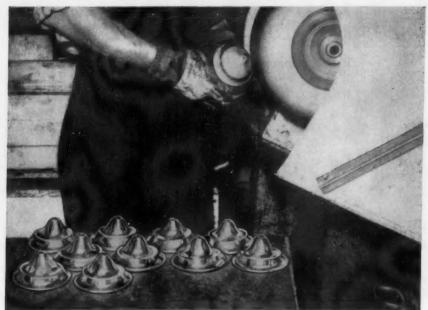
Ask your dealer for Brightboy recommendations and for the Brightboy Catalog listing grains, textures, machine speeds and work suggestions. Write us if he cannot supply you, or on any problem in which finishing is involved.



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America's Pioneer Manufacturer of Rubber-Bonded Abrasives

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THE BASE of a Huntercraft Candelabra Model 8008 (shown below) requires, with Formbrite, only a finish buff. The base is formed in two drawing operations. The deeper drawn candle cups, also of Formbrite, need only a light cutting with Tripoli and a finish buff.

It's easy to get a jeweler's finish with Formbrite



HUNTERCRAFT Table or Wall Candelabra Model 8008, one of 30 fine brassware items in the line of Huntercraft Originals.

The production of Huntercraft Originals—now a nationally distributed line of fine brassware—has grown from a basement hobby to a thriving new business in less than 5 years.

The Hunter Machine Service Company of Racine, Wisc., began manufacturing Huntercraft Originals on a commercial scale in 1951, using ordinary soft forming brass. To get the gleaming jeweler's finish required, polytopic or the property of t

"Formbrite cut polishing cost and time dramatically—was a major factor in keeping our small business alive...and growing," says Ralph E. Hunter of Huntercraft.

ishing time and costs were high. In fact, they were so high that the young company found it impossible to bring their prices into line with competition,

In 1953, they tried Formbrite.

Anaconda's superfine-grain drawing brass. The polishing bottleneck was broken and production soared – unit costs went way down According to Ralph E. Hunter, owner and president of Hunter Machine Service Co., Formbrite was a major factor m keeping the company alive and enabling it to go on to become a stable, growing busi-

ness. The finish obtained so easily on Formbrite, he adds, is superior to that achieved on ordinary drawing brass.

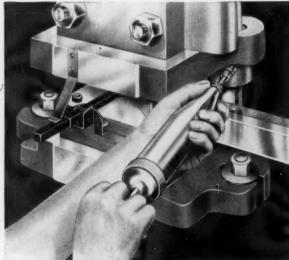
Formbrite is a premium product at a nonpremium price. Find out for yourself how its superfine-grain, excellent drawing properties, strength, and scratch-resistance can help you make a better product at lower cost. Write for Publication B-39. Better yet, ask for a sample or a trial batch. Address: The American Brass Co., Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

Tourbuite SUPERFINE-GRAIN DRAWING BRASS
an ANACONDA product
made by The American Brass Company

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NEW oil lubrication system





ON NEW DANLY DIE SETS



Here is another example of Danly leadership in die set design...the new oil lubrication system for guide posts and bushings. The illustration shows how easily a lubrication gun reaches the oil fitting in the shoulder of the bushing. Once injected, oil fills figure-8 oil grooves in the bushing to assure uniform lubrication for protection that lasts even through long press runs...less frequent oiling is needed, the job is done faster. Isn't this new lubrication system another important reason why you should specify Danly die sets?



complete new "leadership line" catalog

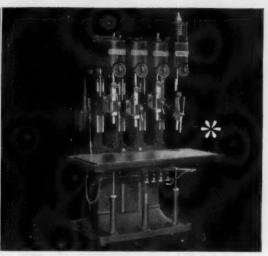
More than 200 pages provide you with more complete design information, easier selection of die sets and supplies. Write for your copy today!

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FOOTBURT FOOTBURT FOOTBURT FOOTBURT FOOTBURT FOOTBURT FOOTBURT



■ No. 2 Machine with Back Gegr • 12" Overhang • 5%" Drilling Capacity in Steel • Optional Speed Ranges • 185 to 2300 RPM • 280 to 3450 RPM • Vertical Motor Drive with Standard Single Speed Motor • Power Feed Assembly • Tapping Attachment • Coolant Outfit.

ensitive drilling machines

A FULL RANGE DRILLING MACHINE ENGINEERED FOR PRODUCTION

■ Built carefully to provide the required accuracy for fine tool room work, Footburt Sensitives are designed with the weight and stability to maintain close tolerances on day after day production work. The correct speed for a wide range of drilling, reaming, and counterboring operations is instantly available. Write for full information on this great line of Sensitive Drilling Machines. Built in 1,2,3,4,6 Spindle Models.

THE FOOTE-BURT COMPANY . Cleveland 8, Ohio

Detroit Office: General Motors Building



Engineered FOOTBURT

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AIR-FEED AUTOMATIC

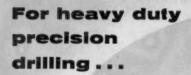
- Permits Greater
 Job Versatility
- 2 Easily Adapted To Multiple Feedouts
- Provides Longer Stock Feedout
- 4 Eliminates Stock Scoring
- 5 Reduces Stock Reel Noise
- 6 Eliminates Stock Pushers
- 7 Eliminates Feedout Cams

Write today for Catalog A-405, or better still, have the Greenlee man call and show you the way to more profitable production with this machine.



GREENLEE BROS. & CO. 1892 MASON AVE. Rockford, Illinois

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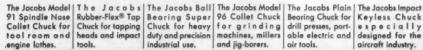


it's a CHUCK

Jacobs and your industrial supply distributor are ready to deliver the chucks you need and the service you deserve. First in chucks . . . first in service. .

THE JACOBS MANUFACTURING COMPANY . WEST HARTFORD, CONN.







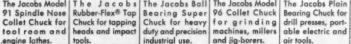
tools.

industrial use.



and jig-borers.







Keyless Chuck especially designed for the aircraft industry.



Watch faces light up like a Christmas tree . . .

... when you put CIMCOOL° on the job in your plant. For CIMCOOL Concentrate—the largest selling chemical cutting fluid in the world—can increase your production and save you money. Here's why:

CIMCOOL LOWERS COSTS because it's longer lasting in machines. Thus, it reduces down-time and cuts labor costs for cleaning and changing.

CIMCOOL DOES A BETTER JOB because of its chemical lubricity. It permits faster speeds and feeds, for it combines friction reduction and cooling capacity in a degree never before attained by old-fashioned coolants.

CIMCOOL 15 CLEAN, doesn't soil hands or clothing. It contains no skin irritants. It leaves no slippery film on shoes, floors, machine or work. It can't smoke, can't burn, and virtually eliminates rancidity and foul odors.

Consult your Cimcool distributor. Or contact us direct. Wire, write, or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

CIMCOOL CUTTING FLUIDS

CIMCOOL Concentrate—The famous pink fluid which still covers 85% of all metal cutting jobs. Effective, economical and clean.

CIMCOOL Tapping Compound—Permits the use of highest tapping speeds and increases tap life amazingly.

CIMPLUS—The transparent grinding fluid with exceptional rust control. Also used for machining cast iron and as a water conditioner with CIMCOOL Concentrate.

CIMCUT Base Additive—For jobs requiring an oil-base cutting fluid. Added to mineral oils, it gives an economical mix for higher speeds and feeds.

CIMCOOL Bactericide—The most effective agent yet developed to overcome rancidity and foul odors.

CIMCOOL Machine Cleaner — The two-phase non-corrosive cleaner that removes grit, dirt, slime and oil.

CIMCOOL Cutting Fluids

for 100% of all metal cutting jobs



A JOB THAT ONLY A Kaukauna HORIZONTAL DRILLING, TAPPING AND BORING MACHINE

CAN DO—faster, easier, at lower production cost

A leading manufacturer of heavy duty earth moving equipment installed a single Kaukauna Model 3040 Drilling Machine and secured far more production work than from the three drilling machines it replaced. Since the original installation, four more machines have been purchased for other plants.

Time and labor savings are tremendous. A majority of the operations are drilling and tapping the roller frames and main frames of large cranes, and boring large holes for the boom pin and bearings in the frame itself. Many of these bores are 6 inches and 7 inches in diameter and require the use of extension bars to line bore the necessary holes.

The extreme rigidity and power of the Model 3040

enable these operations to be performed more quickly than with the usual drilling machines and greatly reduce the amount of crane time and setup time formerly required. Stub-boring operations are also performed easily and quickly due to the accuracy and ease of positioning; floor space is greatly reduced because the Kaukauna has sufficient horizontal travel to cover the entire part; handling and setup time have been cut radically. In addition, the variety of speeds and feeds enables the operator to change quickly from large to small drilling operations with the least amount of idle time.

Learn now what a Kaukauna will do for you by time estimates on your various jobs. Consult your nearest Kaukauna distributor, or phone, wire or write direct.



KAUKAUNA MACHINE & FOUNDRY DIVISION

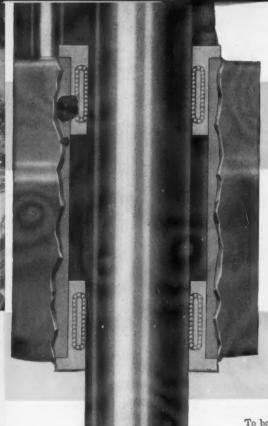
GIDDINGS & LEWIS MACHINE TOOL COMPANY

KAUKAUNA, WISCONSIN, U.S.A.

TELEPHONE ROCKWELL 6-4631

CABLE KAUMACH

For more data circle 242 on Reader Service Card





NEW QUILL BEARING DESIGN helps achieve extreme precision in **Fosmatic Jig Borer**

To bore with precision as close as ±.0001", distance between cutting tool and lower quill bearing must be held to a minimum. Here's how Fosdick minimizes this crucial distance.

The lower quill bearing is permanently located at the lowest possible position in the head, permits boring with spindle nose as close as 21/2" to the bearing. Bearing does not ride up and down with quill and spindle as in conventional designs where balls are held in moving bushings.

The permanent location of quill bearings is made possible by unique Fosdick design-vertical ball races with preloaded precision balls circulating continuously. This design also permits spindle and quill to be shorter; thus stronger and more rigid. Both are perfect. cylinders with no cuts on the outside.

Engineering advancements like this make the Fosmatic Jig Borer the most rigid and precise boring machine you can buy. Write today for the new catalog.

precision measuring systems, milling feed, rapid traverse to quill, power clamping of table and saddle, coolant system and reversing motor control for tapping.

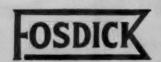
Eight models available from the low-cost Model 30

with 36" x 18" table, to the virtually automatic model 54P with 54" x 22" table. Other important

features: Automatic Positioning, choice of two

NEED JIG BORING EQUIPMENT? GET A PROPOSAL FROM FOSDICK!



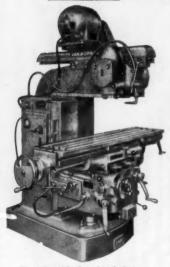


Here's a Profitable Equation:

1 Van Norman Ram Type Miller = 2 Single Purpose Machines

RESULT

LESS Capital Investment
MORE Machine Productivity



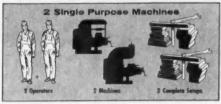
The Adjustable Cutterhead eliminates the need of two single purpose machines . . . permits horizontal, vertical and angular milling without attachments.



WHICH WOULD YOU RATHER HAVE?



OF



You can own a Van Norman Ram Type Milling Machine for as little as \$.81 per day per \$1000. investment.

Write for catalog and purchase plans giving complete details on all Van Norman Ram Type Millers.

Don't wait . . . for extra profits install a Van Norman now! They are

available on many purchase plans— Outright sale . . . Purchase on conditional sales contract up to 5 years . . . Pay as you depreciate . . . See your dealer or write Van Norman Company.

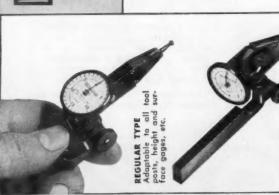
Conditional Sales Contracts not available to Export.

VAN NORMAN MACHINE CO., Springfield 7, Mass.

Manufacturers of: Ram and Column Type Milling Machines, Cylindrical Grinders, Spline and

Gear Grinders, Oscillating Radius Grinders, Special Production Grinders, Centerless Grinders.

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PERPENDICULAR
TYPE
For use on jig borers, in deep holes, etc.



NON-MAGNETIC TYPE
For use on magnetic chucks
parallels and other magnetic

FEDERAL TESTMASTER

Copied in Foreign Countries and by nearly a dozen companies in the United States! The Federal Testmaster, though extensively imitated, has never been

The crown gear movement, original with these Indicators, makes it possible to build-in the exceptionally high accuracy and sensitivity which are so valuable to users. Two different gear ratios are used—one for each model, graduated in .001" (Model 1) and .0001" (Model 2)

Contact pressure is extremely light. Contact points are ratchet-held for positive positioning at any angle within 180° arc-or reversed

The Testmaster is easy to set rigidly in any position and requires no room operations, the Testmaster has a thousand uses. Ask for illustrated complicated adapters that cause inaccuracies due to friction, lost motion and inertia. Ruggedly built for production inspection and exceptionally adaptable to the many tests required in general machine shop and tool

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Dial Indicating, Air, Electric, or Electronic — for Inspecting, Measuring, Sorting, or Automation Gaging



Want to make <u>every</u> day Christmas?

It's easy! Switch to CINCINNATI (PD)° WHEELS. For now CINCINNATI Grinding Wheels offer POSITIVE DUPLICATION—a remarkable achievement in precision manufacturing and quality control that can save you money... and increase your production.

You'll say there is a Santa Claus after all when you learn that through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel every time you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

Yet CINCINNATI (PD) WHEELS are priced no higher than ordinary wheels.

So, to make every day Christmas, just contact your CINCINNATI Grinding Wheel distributor. Or, contact us direct and we'll send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

Remember—only Cincinnati Grinding Wheels give you . . .



A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

* Trade Mark Reg. U.S. Pat. Off.

For more data circle 246 on Reader Service Card

December, 1956

modern machine shop

Grinding Wheels

47



For more data circle 247 on Reader Service Card

Meetings

Important Meeting
Dates

December 3-4 • Institute of Appliance Manufacturers, Year-End Conference, Netherland-Hilton Hotel, Cincinnati. Institute headquarters: Shoreham Hotel, Washington 8, D. C.

December 5-7 • National Association of Manufacturers, Annual Meeting and Exhibit, The Waldorf-Astoria, New York. Association headquarters: 2 E. 48th St., New York 17, New York.

December 5-7 • American Institute of Mining and Metallurgical Engineers, Inc., Electric Furnaces Steel Committee Meeting, Morrison Hotel, Chicago. Institute headquarters: 29 W. 39th St., New York 18.

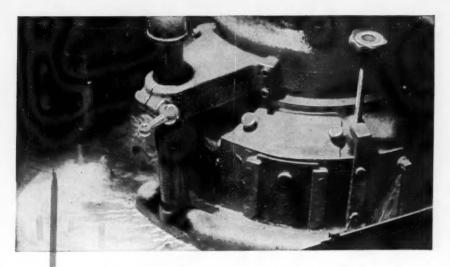
December 9-12 • American Institute of Chemical Engineers, Annual Meeting, Hotel Statler, Boston. Institute headquarters: 120 E. 41st St., New York 17, New York.

January 28-31 • Plant Maintenance and Engineering Conference and Show, Public Auditorium, Cleveland. Information: Clapp & Poliak, Inc., 341 Madison Ave., New York 17, New York.

January 30-31 • Relations-With Industry Division of American Society for Engineering Education, Ninth Annual College-Industry Conference, University of California, Los Angeles. Information: University of California Extension, Engineering, Los Angeles 24, California.

Name.....

Company



for better grinding... **K-7**

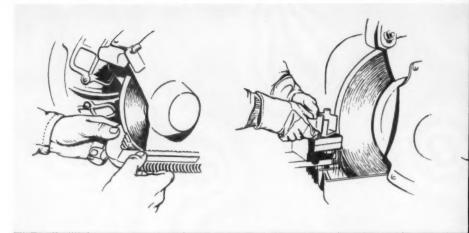
K-7 gives superior results in grinding all steels, cast and malleable irons, titanium, carbon, rubber, ceramics and plastics (not recommended for non-ferrous metals). This all-chemical water soluble liquid concentrate is transparent and colorless in solution, is non-foaming and runs absolutely flat under all conditions. Low pH (alkalinity) makes it easy on the skin. K-7 solutions do not load work wheels, and this means fewer dressings, longer wheel life and a true ground finish. Write for further details today.



F. E. ANDERSON OIL COMPANY INC.

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Great news about your general purpose grinding

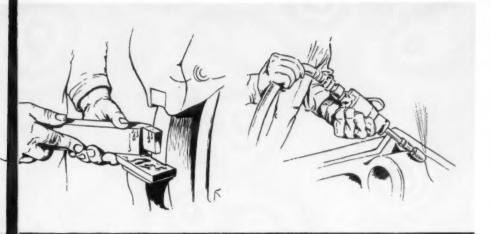
You get the profit-boosting "TOUCH of GOLD" from Norton general purpose wheels — as you do from the Norton wheels on your production jobs

Remember this about your general purpose bench and floor stand grinding, and mounted wheel operations . . . Norton builds wheels in every abrasive-and-bond combination you need. In particular, 44 ALUNDUM* abrasive is the new, revolutionary Norton development that's tops among all non-premium priced aluminum oxide abrasives. Tough, versatile "44" wheels solve plenty of grinding problems for new users — with out-

standing performance for less money.

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Your Norton Distributor, one of over 315 in the United States alone, is your contact with the largest, most efficient service and supply system in the entire abrasive field. He'll give you fast deliveries on the wheels you want, plus details on how Norton wheels bring the product-improving, profit-boosting



"Touch of Gold" to every one of your general purpose grinding jobs.

Ready For You — And Full Of Facts And Prices

This latest Norton wheel catalog brings you plenty of information and recommendations on the types of wheels that will give you best results in your particular grinding jobs. List prices are there, too — and also included is a brand new supplement covering discount net prices for the complete line. Get it now from your Norton Distributor. Or write to the

nearest district office of Norton Com-PANY, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grind-

ing Wheels" in your phone book, yellow pages. Behr-Manning Company, Troy, N. Y., division of Norton Company. Export: Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.





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*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries W-175

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December, 1956

modern machine shop

51



Internal broaching of a cam ring. Note the complexity of the ring design. The steel is soft and tends to tear, yet this Continental Broach sizes the I.D. and cuts 8 splines 5/16" deep in one pass.

REMOVE STOCK TO PRECISION LIMITS - FAST ... ROUGH AND FINISH IN ONE PASS!

The scope of Broaching has broadened in recent years. Many broaching operations do precision work in far less time than other metal-cutting methods.

Continental Engineers have for years been designing all types of cutting tools and broaches. They can recommend without bias your most economical way to do the work.

For facts about increasing your production by broaching, call in your local Ex-Cell-O representative -or write Continental in Detroit for Cutting Tool Catalog.



EX-CELL-O CORPORATION DETROIT 32, MICH.

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Free-running on dead centers-with COMPLETE protection. CMD Lubricants are CONCENTRATED, form a "tough" film—absolutely NO GALL-ING or SEIZING—under the heaviest load. STABILIZED for added "oiliness" giving longer, smoother runs without slip-stick action. It all adds up to LIVE CENTER ACTION with DEAD CENTER PRECISION. The bigger the job, the better you'll like it.

TRIAL ORDER-TWO FOUR OZ. TUBES \$1.00

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AND DISTRIBUTING CO. For more data circle 252 on Reader Service Card

CHICAGO MANUFACTURING

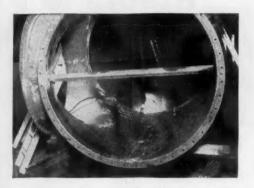
when an electrode with the speed of Jetweld

as easy operation in all positions

Let costs less than other iron powder electrodes

WHY

use anything but Improved FLEETWELD 47 on hard-toposition jobs



Improved FLEETWELD 47

iron-powder electrode for mild steel with AC or DC

cuts welding costs by:

- having one electrode for downhand and out-ofposition work
- e easier welding with no tendency to sticking
- higher deposition rate . . 10% to 30% faster arc speed
- up to 30% more weld per rod
- less spatter
- easier slag removal

than conventional E-6013 electrodes.

Send for Specifications and Procedures in Weldirectory SB-1351.

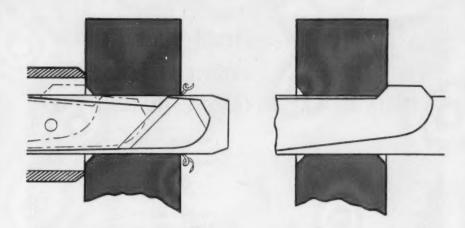
THE LINCOLN ELECTRIC COMPANY

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LINCOLN . . . one dependable source for all your welding needs

0 1956 The Lincoln Electric Company

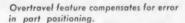
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The Cogsdill BurraMatic chamfers from inside-out!

The Cogsdill BurraMatic size controlled chamfering tool has been especially designed to deburr and chamfer holes on any metal part using a forward feed stroke only.

Among its exclusive precision chamfering features, important for high production applications requiring different depths of chamfer on top and bottom, the BurraMatic tool offers separately adjustable cams for depth control on both sides.



Cam action collars for adjustments to upper and lower chamfer.

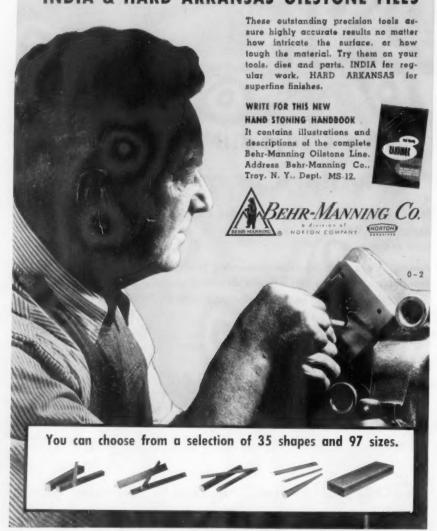


Low-cost cutting blade replaceable by removal of pin.

Soil TOOL PRODUCTS, INCORPORATED

12980 West Eight Mile Road, Oak Park 37, Michigan For more data circle 254 on Reader Service Card

Here's the final touch for a close tolerance job... INDIA & HARD ARKANSAS OILSTONE FILES



For more data circle 255 on Reader Service Card



Shearing capacity of this machine is 12'.0" x 10" mild steel. Note accessibility of two cranks on right end housing. Upper crank is for knife adjustment. Lower one is for back gauge adjustment.

Adjustable Blade Clearance Allows Use of Shear for Complete Range of Thicknesses

THE feature that Vinson Steel and Aluminum Company likes best on their Steelweld Shear is the adjustable blade clearance. This permits them to use the one machine for their complete range of thicknesses. They go as low as 26 gauge galvanized material and up to ½ inch mild steel and ½ inch aluminum.

As a leading supplier of metal in North and West Texas, Vinson insists on cuts being sharp, straight and accurate. This requires that the blade clearance be correct for every thickness cut. Because of the unique easy method of adjusting the clearance on Steelweld Shears, the adjustment can be made in seconds.

Another item which is impressive is the low maintenance cost. This machine has been in service for over two years, and the maintenance has been practically nil.

More and more warehouses are installing Steelweld Shears. Usually one will handle a range of work that would require two or more other type machines not built with a fast knife adjustment feature.



GET THIS BOOK!

CATALOG No. 2011 give construction and engineering details. Profusely Illustrated THE CLEVELAND CRANE & ENGINEERING CO.

6452 East 282 Street, Wickliffe, Ohio

STEELWELD PIVOTED SHEARS

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high scorer

... and in high speed steels, it's always **REX**

Crucible's REX® high speed steel always scores highest in performance—as it has for more than a half century. That's because it is consistently sound and uniform in structure... with dependable response to heat treatment.

But don't take our word for it. Check REX for yourself—by any test you choose. You'll discover that recent improvements in manufacturing techniques have made it better than ever—why REX is today, as it's always been, the standard by which all other high speed steels are compared!

REX is immediately available at all Crucible warehouses, or on prompt mill delivery. For a list of helpful data on REX and other special steels, write for a free copy of the "Crucible Publication Catalog." Crucible Steel Company of America, Chamber of Commerce Bldg., 7th Ave. and Smithfield St., Pittsburgh 30, Pa.

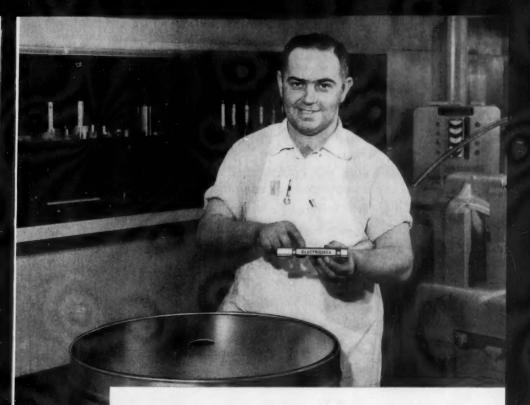
CRUCIBLE

first name in special purpose steels

Crucible Steel Company of America

Canadian Distributor - Railway & Power Engineering Corp., Ltd.

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Lapping and Electrolizing



Exclusive T-P Pilot

Make Taft-Peirce Gages Wear Many Times Longer!

Your money goes a long, long way when you order T-P Electrolized Gages! The combination of lapping plus electrolizing means that every gage will stay accurate, longer. Precision lapping produces an exact-sized gage - no "hills" and "valleys" to wear rapidly and destroy gage accuracy. Electrolizing puts an even film of hard, nonmagnetic alloy on all gaging surfaces to give exceptional wear resistance. Initially costing only slightly more than ordinary hardened steel gages, Taft-Peirce Electrolized Gages more than pay for the difference in longer gage life. Result: Your budget for gages goes much farther, and your inspectors work with the best accuracy you can buy. For more information, call or write: The Taft-Peirce Manufacturing Co., Woonsocket, R. I.

The Taft-Peirce Family

Air Gages Magnetic Chucks

Tool-Room Specialties Grinding Machines Precision Gages Lapping Machines



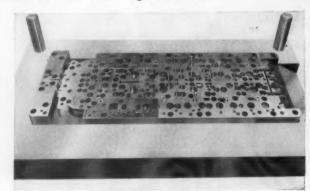
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THE TAFT-PEIRCE MANUFACTURING COMPANY WOONSOCKET, RHODE ISLAND T-P Means TOP Precision

Holes JIG GROUND

with Vulcanaire

Provide yourself with this inexpensive* instrument for use on your present equipment and JIG GRIND with a guarantee.





Standard sized punches and buttons were used. But since forming and piercing operations were involved, hardening of the sections was necessary followed by JIG GRINDING. Result: Close tolerances held easily and perfect progression throughout — another satisfied customer.

*Vulcanaire equipment pays for itself on the first job.

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VULCAN TOOL CO. • 710 LORAIN AVE. • DAYTON 10, OHIO

LOOK what you get with a Low-Cost DOALL

... A DoALL any shop can afford—choose from 10 different models. Saw, file, grind and polish ... $15\frac{1}{4}$ " and 30" throat depth, 12" work capacity, fixed or infinitely variable speeds. Three ranges from 50 to 5200 fpm.

Rugged dependability and DoALL quality are part of every machine . . . but there's more. These lowpriced Contour machines come to you complete with these free services:



Technical Assistance—Each DoALL representative is trained to select the right blades and help set your machine to operate at optimum efficiency.



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Local Stocks — Accessories, replacement parts, 18 kinds of band tools . . . immediate delivery . . . in 38 major centers.

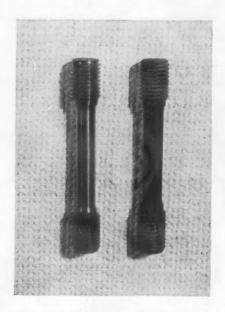
See your local DoALL Sales-Service Store today or write:

THE DOALL COMPANY, Des Plaines, Illinois



How Armco 17-4 PH Stainless Bars

can cut down shop work



After normal 1800 F heat treatment, threads on this part made of Type 416 stainless steel (right) are scaled and distorted. In contrast, threads of the Armco 17-4 PH Stainless part (left) are sharp and clean after a standard low-temperature (900 F) heat treatment.

You can get finished parts with high strength and hardness in only two operations when you work with Armco 17-4 PH Stainless Steel bars.

Here's why:

This special stainless steel can be finish machined . . . then hardened by *low temperature* heat treatment. There's no scaling or distortion. What's more, parts made of 17-4 PH have greater corrosion resistance than those produced from standard hardenable stainless steels.

For more information about special Armco 17-4 PH Stainless, and its companion grade, Armco 17-7 PH, write us at the address below.

ARMCO STEEL CORPORATION

2496 CURTIS STREET, MIDDLETOWN, OHIO

SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

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Bearings, Inc. the foundryman's friend...through service!

♥ Dirt... the most feared enemy of any good anti-friction bearing was damaging many bearings in the maintenance stock at the Taylor and Boggis Foundry Division of The Consolidated Iron-Steel Mfg. Co. of Cleveland, Ohio. John Cunin, Bearings, Inc. salesman, was called and within a short time, under the direction of the Taylor and Boggis Maintenance Superintendent reorganized their maintenance stocks of bearings and developed a more practical record keeping system.

First—all bearings in stock long enough to be affected by foundry dust were taken to Bearings, Inc. There, they were thoroughly cleaned, rewrapped and repackaged to be as dustproof as possible.

Second—all bearings in use in the foundry were identified by the Bearings, Inc. salesman according to the bearing manufacturers' numbers. By converting the equipment manufacturers' parts numbers to standard bearing numbers, many bearings purchased from various sources under a variety of parts numbers were found to be identical.

Weeding out these duplicates greatly reduced Taylor and Boggis purchases for inventory. Bearings, Inc. now knows what bearings the foundry uses and makes certain stocks for any emergency are carried at our branch. Taylor and Boggis now installs only factory-fresh bearings from inventory or orders from Bearings, Inc. and receives the bearings they need immediately.

Need this kind of service—service with a capital "S"? Just call our nearest branch—no obligation, of course.

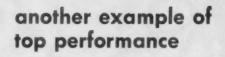
Rendering bearing service in the territories adjacent to our branches, listed below.

BEARINGS, INC.

O HI O I A ... Commo Contenti o Correlado ... Zanoscillo III A ... Zanos

Subsidiaries: Balanrol Corp. • Buffalo, N. Y. • Kentucky Ball and Roller Bearing Co. • Louisville, Ky.

For more data circle 262 on Reader Service Card



maximum holding with

ANTON MAGNETIC PARALLELS

7 Parallels 2½" x 3" x 9" place one on top of another (a total height of 21") indicated a pull of more than 13 lbs, per square inch. Designed for ruggedness and dependability, long life through traditional high quality. Comes in a complete range of sizes.



Anton

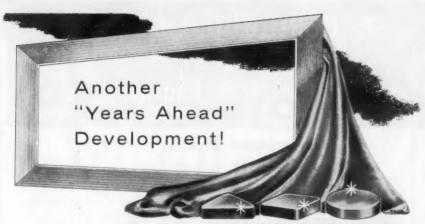
Write today for complete technical data to:

Machine Works

1226 Flushing Avenue, Brooklyn 37, New York

Standard & Magnetic Parallels • Standard & Adjustable V-Blocks • Diamond Holders • Milled Blanks

For more data circle 263 on Reader Service Card



NewMet* by NEWCOMER

The first all-new high velocity metallic cutting material

Capable of cutting performance beyond present machine capacities...

A result of ten years of Newcomer research and development, NewMet has opened an entirely new field for high velocity cutting of steel, cast iron and non-ferrous materials. Containing no strategic materials, NewMet is designed to outperform superbly at both normal cutting speeds or the higher ceramic and cemented oxide speeds . . . speeds of 1000 SFPM and more . . . 2 to 3 times the speed of existing "high speed" carbide cutting grades!

Economize with high velocity cutting . . .

Combining extreme hardness with a comparative high strength, NewMet has losted 8 to 10 times longer than existing "high speed" carbide grades when operated at normal carbide finishing speeds: It's practically impervious to cratering and wear.

Look ahead to new cutting velocities . . .

Specify NewMet*

Available now in NP "Throway" Triangular, Square and Round Inserts, and Solid Cylinders.

For complete information, call your nearest Newcomer Representative, or contact

NEWCOMER PRODUCTS, INC.

LATROBE, PA.

GENERAL SALES OFFICES: 512 Franklin Ave., Pittsburgh 21, Pa. . CHurchill 1-4060

For more data circle 264 on Reader Service Card

December, 1956

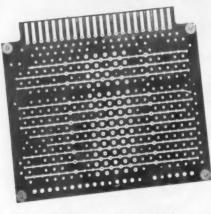
modern machine shop

65

TRACER-GUIDED DRILLING 100 HOLES P. M.

WITH NEW HERMES Engravograph

for printed circuit plates



 Pantograph reproduces drill pattern from template in any reduction ratio — assuring high accuracy.

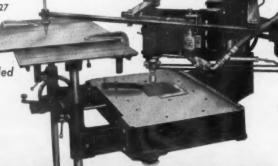
 Allows drilling and routing of different size holes in one operation without changing tools.

Pneumatic attachment with adjustable feed gives high speed production.

Ask for catalog H-27

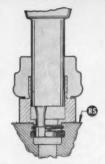
Also for tracer-guided

ENGRAVING PROFILING GRADUATING

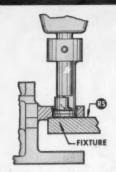


13-19 University Place, New York 3, N.Y.

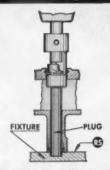
Even Unskilled Labor Can Use This Versatile Tool Accurately! It Simplifies Internal Grooving Problems, Cuts Production Costs!



A) Cuts two grooves of different depths and widths in one single operation from same reference surface.



B) Cuts groove in bore located in protruding member of workpiece. Reference surface on under side of protrusion.



C) Cuts grooves in two bores of different diameters from same reference surface. Tool banks on reference surface. Then workpiece is reversed and tool banks on plug.

Amazingly versatile! Your toughest recess cutting problems can be met simply and efficiently with the Waldes Truarc Grooving Tool because it offers a whole range of possibilities beyond the range of ordinary recessing tools.

Wide Cutting Range! The Waldes Truarc Grooving Tool comes in 5 models...enabling you to cut accurate grooves in housings with diameters from .250 to 5.00 inches.

Send Your Problems to Waldes! Send us your blueprints...let Waldes Truarc Engineers give you a complete analysis, price quotation and delivery information on the most economical tool set-up for your particular job. There is no obligation!

Write NOW for a 20-page manual containing full information on Waldes Truorc Grooving Tool





Made by the Manufacturers of Waldes Truarc Retaining Rings WALDES KOHINOOR, INC., 47-16 Austel Place, L. I. C. I, N. Y. Waldes Truarc Grooving Tool Manufactured Under U. S. Pat. 2-411.426

Waldes Kehincer,	, Inc., 47-10 Aus	tel Pl., L.I.C. 1, N. Y
		ing Tool. MM-128
Name		
Title		
Company		
Address		
City	Zone	State

For more data circle 266 on Reader Service Card

ANOTHER GREAT TIP FROM OUR MADISON MAN!

GUN DRILLS FOR CONVENTIONAL HOLES!

"He told us they'd be faster and they are . . . We're doing the operation in less than half the time. He said we'd need fewer passes, and he's so right . . . we now get a finished hole with one pass! Our tolerances are closer and our surface finish better than ever before . . . in less time and at much lower cost."

If you are interested in cutting conventional drilling costs with Madison Gun Drills, write for our new literature that tells exactly how. And let your Madison man advise you on other hole problems, too. He'll advise the right tools for every job. He knows 'em all – because he has 'em all! For further information write Dopt. MM—56

Let the man with the holes in his head tell you how to cut costs in:

- * Boring
- * Reaming
- * Deep Hole Drilling
- * Trepanning
- * Roller-Burnishing
- * Gaging

MAIL COUPON TODAY

Please send me literature on Madison
Gun Drills.

Have representative call.

NAME____

ADDRESS.

CITY



Inner Diameters Are Our Business

WOSTORIN

INDUSTRIES IN

Muskegon, Michigan

ASSOCIATED WITH MADISON - FAESSLER TOOL CO.

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ACCO products

Wilson"Tukon" Micro Hardness Testers

UNEXCELLED

for testing fine parts...
METALLIC and
NON-METALLIC

Model LR—Floor model for Micro and Macro Hardness Testing.

•WILSON "TUKON" Micro Hardness Testers meet every fine test requirement. These precision instruments are invaluable in the proper testing of fine precision parts, fine wire, thin metal, shallow superficially hardened surfaces, jewels, plastics, glass, etc. WILSON "TUKON" testers operate with both Knoop and 136 degree Diamond Pyramid Indenters.

Consult with WILSON Engineers

Experienced WILSON Engineers will be glad to help you select the proper model for your particular requirement. This choice depends on the type and thickness of work to be tested, range of loads and other hardness testing equipment available.

Write for Booklet DH-328 on WILSON "TUKON" Micro Hardness Testers. Ask for DH-325 on WILSON "ROCKWELL" Hardness Testers.



the world's standard of hardness accuracy

Wilson Mechanical Instrument Division

AMERICAN CHAIN & CABLE

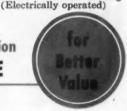
230-G Park Avenue, New York 17, N. Y.

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Model FB-Floor model for

Micro Hardness Testing.

CCO



90 to 3750 r.p.m. The right speed for the job! Controlled by convenient lever on front of cabinet. Precision dial shows selected speed. No belts to change — no tools to bother with!

Put this 11/8" collet capacity, 9"

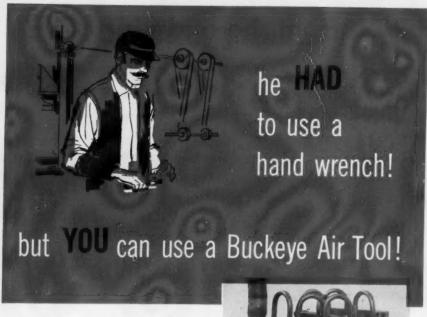
swing lathe in your shop for the fine, fast and variable work uneconomical on larger machines. Learn how you'll out-produce and under-cost by writing for Bulletin 918SL.

RIVETT LATHE & GRINDER, INC.

Dept. MMR 12

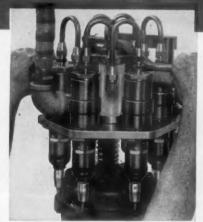


For more data circle 269 on Reader Service Card



This Buckeye Tools multiple-unit fastening tool runs down six hex head bolts simultaneously. It could be designed to handle more bolts, different sizes of bolts, or to run them down at different levels at the same time. Or, it could run down bolts at various angles, even straight up!

This is just one of many new Buckeye fastening tools. Are you sure you're doing your fastening work the modern way? Our Catalog A-10 will help you decide—and it's yours for the asking.



Why AIR Tools?

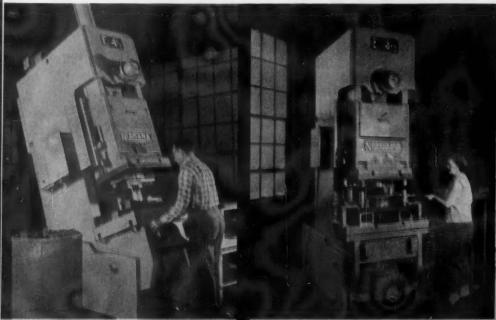
Because air is everywhere, just waiting to be put to work . . . because continuous operation can't possibly harm an air tool . . . and because, using Buckeye air tools, you can almost forget about tool maintenance.

In Air Tools, Your Best Buy Is Buckeye Buckeye Tools

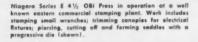
For more data circle 270 on Reader Service Card

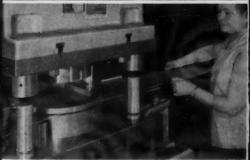
Take it from the early birds...

"IT'S THE GREATEST









Niagara Series E $4\,V_2$ OBI Press engaged in blanking and drawing of kitchen cannister lids from half-hard aluminum at midwestern houseweres manufacturing plant.

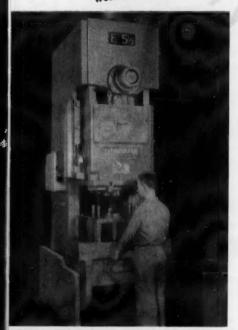
"we can produce from 8,000 to 10,000
pieces in an eight hour day"

"has a centralized pressure lubricator which we like very much"

O.B.I. EVER BUILT"

"we find that dies without posts work much better on this press"

"large slide area for large trimming, blanking and progressive dies" and longer runs".





Niagara Series E 5½ OBI Press ferming and trimming hemispherical copper parts for one of the "Big Two" electrical manufacturers.

Few developments in metalworking history have drawn the enthusiastic endorsement given Niagara's revolutionary Front-to-Back Crankshaft OBI Press,

Now, as at the 1955 Machine Tool Show where it was unveiled, there is nothing even remotely resembling it in the industry...design-wise and production-wise.

Customers in U.S. and Canada...the "early birds" who are doing their modernizing with the most modern press of all...can today tell you about accomplishments with this newest and greatest of OBIs that you would have never dreamed possible. Yes, the press that Niagara conceived to do more than any OBI ever built is doing just that for a fast-growing list of metalworking plants.

There's a huge fund of successful experiences that a Niagara representative can share with you today. Draw on it now and utilize it in your modernization plans. Make a date, at your convenience, for a personal call.

... and if you haven't received new Bulletin 56 with complete design description and specifications (75-200 ton capacities, 4½-7½ inch shaft diameters, standard and automated models) write for your copy at once. You will find it invaluable to your planning.

NIAGARA MACHINE & TOOL WORKS . BUFFALO 11, N.Y.

Buffale • Cleveland • Detroit • Indianapolis • New York • Philadelphia Distributors in principal U. S. cities and major foreign countries

America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work



INCLINABLE PRESSES

Save on small grinding jobs with Moore Motorized Centers

Toolroom attachment for surface grinders, jig borers, drill presses, millers, etc., handles flat, curved or circular work in one setting.



Double tapers and hex shoulder ground with a single setup.



Grinding a 10° taper on a machine part 5" long, 5" in diameter on centers.



12 equally-spaced slots in punch holder ground by using index plate.



You no longer need to tie up large machines on grinding square and round punches ... doing taper grinding, index grinding and face-plate work. Moore Motorized Centers, a portable, precision-built accessory, can be set on a surface grinder chuck in a jiffy and the job completed quicker than the grinding wheel on a large machine can be changed. You'll save on toolroom labor and materials.

With Motorized Centers, in one setting, you can grind flat, curved or circular work—in any combination of taper or contour—all within .0005". The index plate allows indexing in the same operation, too. Tapers can be reversed or changed by loosening two screws in the rocking bed, and the index plate can be engaged by merely pressing a plunger. The simple tail-stock center readily permits the use of specials—male, female or cutaway.

Catalog with 20 Action Photos shows many toolroom jobs you can handle with this versatile tool. Write for a copy today.

SPECIFICATIONS										
Length-overall .										12
Width-including										10
Height—overall .									0	8
Distance between c			-n	nax	imi	ım				6
Centers will swing				0	4.					6
Max. grinding angle										309
Motor	. 1	1/2	5 F	I.P.	., 1	15	vol	t, 6	60	cycle
Work Speeds					110)-22	20-4	140	R.	P.M

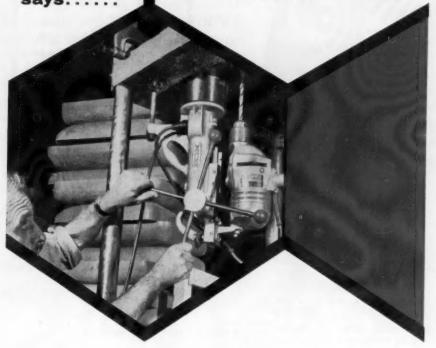
Moore Special Tool Company, Inc.

730 Union Avenue, Bridgeport 7, Conn.

For more data circle 273 on Reader Service Card

KOCH FIBERGLAS says:....

"With our Bux, we now do 8 hour drilling jobs in 2 hours!"

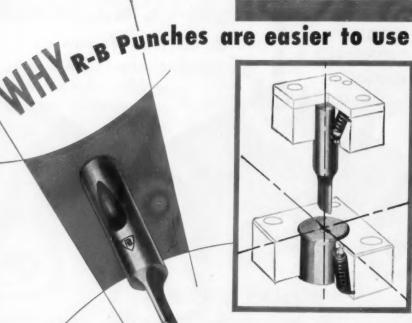


"At our plant in Corte Madera, we save six man hours on tough overhead drilling jobs, thanks to our Bux," says John Daly, Machine Shop Foreman. "It used to take two men 8 hours to drill 90 9/16" holes in platens to make die changes. Now with our Bux model L-2 portable magnetic drill press, 2 men do the job in less than 2 hours! In the first month's use, we more than paid for our Bux. Around here we never take a job to the drill—we always take our life-saving Bux to the job." The experience of the world's largest manufacturer of fiberglas luggage is like that of every efficient shop using a Bux drill press. Why not call your local Bux dealer for a money-saving demonstration right now."



BUCK MFG. CO. 100 Roberts Rd., Les Gatos, California

For more data circle 274 on Reader Service Card



Just a push, a twist, and "click" your R-B punch or die button is accurately ALIGNED and LOCKED in place. The R-B bal lock provents radial or vertical movement of the punch or die button in the retainer-no additional keying is required. R-B punches and die buttons are just as easy to remove -simply insert tanged tool in retainer hole to release ball lock. Standardized and completely interchangeable in any shape or size, these easy to use punches and die buttons save your time and energy.

No other manufacturer of punches and die buttons can offer you the amount of successful application experience and the scope of knowledge that is available from the R-B engineering staff for:

- * Cutting Your Production Costs
- * Reducing Die Designing Time
- * Increasing Productivity of Presses
- * Supplying Answers to Piercing Problems
- * Saving Die Construction Time
- * Complete Standardization of Press Tooling

For Additional Information or Engineering Service, Write to:



76

RICHARD BROTHERS PUNCH DIVISION ALLIED PRODUCTS CORPORATION

For more data circle 275 on Reader Service Card

modern machine shop

December, 1956

ATTACHMENTS for Bridgebort

TURRET MILLING MACHINES add outstanding versatility to a machine already versatile

When you buy the BRIDGEPORT TURRET MILLING MACHINE, you buy more than a conventional vertical milling machine. You actually buy and get a machine of a type conceived, created and developed by Bridgeport. In addition to the turret principle originited by Bridgeport, attachments have been designed which add a great many features to the machine so that its basic purpose for milling, drilling, boring and shaping has been extended to include also cherrying, right angle milling as well as copying with the Bridgeport Hydraulic True Trace Combination.

One of the outstanding advantages of this machine is that you can buy this basic machine with some or all of these attachments or add them later whenever the need arises for the handling of specific operations.



CHERRYING ATTACHMENT

Makes possible production of convex and concave shapes. Ideal for producing drop forge dies, molds, cavities.



TRUE TRACE COMBINATION

The Bridgeport True Trace Combination will give excellent performance and save endless hours when copying irregular dies and

Investigation of Bridgeport Milling Machines and their many attachments is always in order.



Bridgeport MACHINES, INC.

No. 2 BORING

HEAD

Boring Tools and

Holder provide

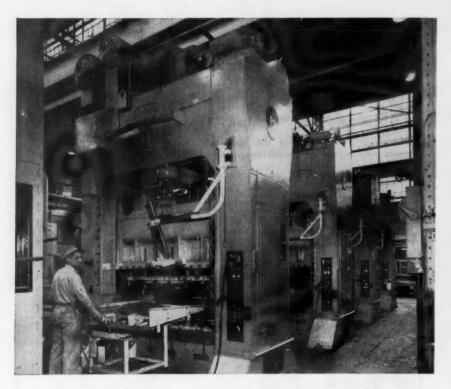
means for boring holes up to 6" di-

Manufacturers of High Speed Milling Attachments and Turret Milling Machines

For more data circle 276 on Reader Service Card

Bridgeport, Connecticut

ameter; available for use on Bridge-port 1 HP Milling, Drilling and Boring Attachment.



Dependable **CLEVELAND Presses** Hold Automotive Stamping Costs Down! These four Cleveland Presses recently installed at a leading automotive stamping plant are further testimony of the dependable performance built into every Cleveland Press. Their selection clearly indicates their ability to produce low cost stampings on high production schedules . . . indicates their ability to "stand up" under the demands of round-the-clock operation.

You, too, can earn extra profits by investing in new, more efficient Cleveland Presses. You'll find that the instant response and exact control made possible with the patented Cleveland Clutch speeds operation . . . reduces rejects. Their extra rugged construction assures reserve capacity . . . lasting slide alignment for continued accuracy. One of the 11 specialized types of Cleveland Presses is sure to be your answer to greater stamping economy. Write or call today!



WER PRESSES - FABRICATING TOOLS

E. 40th & St. Clair Avenue, Cleveland 14, Ohio Offices at: NEW YORK + CHICAGO + DETROIT
PHILADELPHIA + E. LANSING
CITY FOUNDRY DIVISION - SMALL TOOL DEPARTMENT



For more data circle 277 on Reader Service Card

Why the Contract Shop Owner Prefers PRODUCTO Die Sets



They help protect his profits

The contract shop owner prefers Producto die sets because they help protect his die performance...his delivery promises...his profits.

The shop owner favors Producto because he can choose from a wide range of die set styles and thicknesses in steel, semi-steel or a combination.

He knows that when his dies are mounted in Producto sets, they will retain the precision built into them. He can expect maximum die life, maximum production with minimum press downtime for regrinding.

The shop owner likes the fact that Producto offers him a choice of two classes of precision, and that be pays only for the amount of precision be buys.

He knows that whoever handles the die will spend the least possible time taking it apart and putting it together because Producto's Qwik-Fit Guide Pins minimize die set assembly problems.

Most important, the shop owner can depend on

efficient Producto service and strategically-located Producto distribution centers to protect the delivery promises he makes to *bis* customers.

When the contract shop owner thinks in terms of protecting his profits, he thinks of Producto die sets and accessories. You should, too.

NEW DIE SET CATALOG No. 11 is another reason the shop owner prefers Producto. It makes selection and ordering really easy. Write for your free copy today. And ask to receive Die Set Digest, too.



THE PRODUCTO MACHINE COMPANY
910 Housatonic Ave., Bridgeport 1, Connecticut



Wherever die sets are used

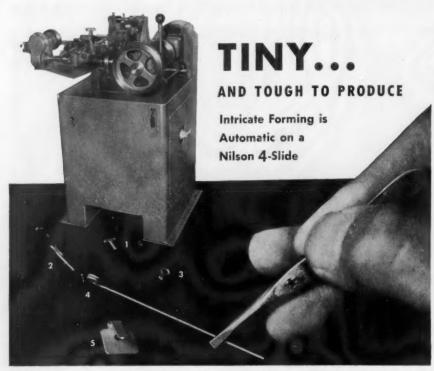
PRODUCTO PRECISION DIE SETS

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December, 1956

modern machine shop

79



Small wire and ribbon metal forms shown here in actual size are typical examples of modern precision production on a Nilson #00 4-Slide. Compact in size, this 4-Slide produces up to 375 pieces per minute in material not exceeding .040 dia. and 3" in blank length, Easily access to tooling, accurate feeding to within .003, and rugged construction assures years of precision forming.

- 1 Mercury Switch Part 014" x . 019" platinum wire, formed with tolerances within .001" on over-all length. Production rate, 175 per minute.
- wide phosphor bronze formed at a production rate of 200 per minute.

- 3 Swivel Part025" brass wire. Heading operating includes eye formed with tolerances within .008", shank within .003 tolerance. Production rate, 300 per minute.
- 4 Leadwire 026" soft tinned copper wire formed at a rate of 140 per minute with two 7/64" diameter windings.
- 5 Contact Part010" x %" wide phosphor bronze formed at 175 per minute.





1514 RAILROAD AVENUE, BRIDGEPORT 5, CONN.

Automatic Chain Making Machines . Staple Ferming Machines . Wire and Stock Rooks . Wire Straightening Equipment . Slide Feeds for Presses . Wire and Ribbon Stock Forming Machines

For more data circle 279 on Reader Service Card

Abrasive Cutting the best way to cut many materials the only way to cut some

Allison Cut-Off Wheels

Cut 11/4" Bar Stock in 6 seconds

Abrasive wheel cutting is faster than sawing. In many cases it is ten to twenty times as fast.

An abrasive wheel will cut the hardest materials with ease. No need to anneal or otherwise prepare material for cutting.

A properly selected abrasive wheel leaves a finish which requires little, if any, "cleaning up" operations.

At the left an Allison Abrasive Cutting Wheel is shown cutting 11/4" bar stock in 6 seconds per cut.



It pays to consult a specialist...

Profitable abrasive cutting means the right abrasive wheel ... and the proper abrasive cut-off machine...for the specific job. Why not let an ALLISON abrasive cutting specialist check your hardest cutting job?

> Send for Booklet "ABRASIVE CUTTING" today



ALLISON DIVISION AMERICAN CHAIN & CABLE

254-D Island Brook Avenue, Bridgeport 8, Conn.

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Catalog OB-54 gives Verson O.B.I. specifications and design details. Write for your copy. Economy, convenience and versatility—these are the reasons for the expanding use of Verson Open Back Inclinable Presses, even on big capacity jobs like the one illustrated.

In Verson O.B.I.'s you get design and construction features normally associated with large, costly specialized machines . . . and you get the liberal slide and bed area, stroke length and depth of throat that assures their adaptability to jobs well beyond ordinary ideas of the O.B.I.'s limits.

Verson O.B.I.'s are available in capacities ranging from 90 to 250 tons in standard and special types. Let us go over your requirements with you and show you how Verson O.B.I. Presses can help you to lower costs.

A Verson Press for every job from 60 tons up.



ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

VERSON ALLSTEEL PRESS CO.

9310 S. Kenwood Avenue, Chicago 19, Illinois So. Lamar at Ledbetter Drive, Dallas, Texas

MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES

TOOLING • DIE CUSHIONS • VERSON-WHEELON HYDRAULIC PRESSES

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TOPS

AUTOMATIC FILTERS

- . . . in minimum space requirements
- . . . in maximum flow capacities
- . . . in versatility of application

THE

Delpark



FILTER-MATIC

TUBULAR SCREEN TYPE FILTER
5 TO 1000 G.P.M. FLOW CAPACITIES

Tubular screens of small diameter manifolded together into a common suction header form the high capacity filtering elements for the new Delpark Filter-Matic.

The tubular screens, through which the liquid is drawn, are cleaned by an automatically controlled reverse flow through the screens. Sludge removed drops to the bottom of the tank and is carried out by continuously operated chain driven flights. Filtered liquid is supplied from a reservoir and the supply is not interrupted during cleaning.

Delpark Filter-Matics may be used with precoat for which an automatic precoat feeding device is supplied.

Write for more detailed information on this newest development in filtration for industry.



. . . FIRST in Filtration Advancements

INDUSTRIAL FILTRATION COMPANY

13 INDUSTRIAL AVENUE LEBANON, INDIANA

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December, 1956

modern machine shop

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Now...a low-priced heavy-duty soluble oil, with active germicide and E. P. base oil additives!



and rust eliminated.

Reaming—No rancidity after 7 weeks;
roal life increased from 10 to 15 pieces
per grind; better finish; no rancidity.

Drilling—Well over 100 per cent increase in tool life.

Turning, reaming, tapping, and threading—Immediate improvement in finish; 50 per cent boost in life of all tools.

Turret lathes-Tool life doubled, ma-

chining 4620 steel forgings; rancidity

Broaching—Vast improvement in finish and tool life broaching internal gear teeth, at 30 to 1 dilution.

General-purpose-Saving \$7200 per

month by using in 365 different machines; rancidity eliminated.

Turret lathes—Coolant life extended to six weeks, with no rancidity or rust; now using as general-purpose cutting oil.

Turret lathes-Doubled number of parts per tool grind.

Surface grinders—Superior finish; good wheel life; no rusting or obnoxjous odors.

Tapping—Increased pieces per grind from 250 to 1800, tapping tough steel forgings.

Threading-Producing 60 more forgings per set of chasers; no rancidity.

Read what leading metalworking plants say about Stuart's

DASCO D-20 #



Proved on job after job!

DASCO D-20*

Exclusive new formula brings you better performance...cutting or grinding!

Stuart's Dasco D-20 drastically reduces the number of different cutting fluids needed in your plant—maintains or upgrades performance of your machines and cutting tools! For wide application on many different operations not requiring highly developed water-mix grinding and cutting fluids like Stuart's Codol or Stuart's Solvol, this new low-cost water-mixture has an E.P. base oil additive that provides high antiweld and lubricity characteristics, plus superior wetting ability.

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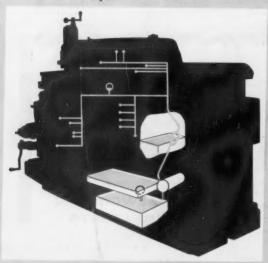
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December, 1956

modern machine shop

89



Sun's Heavy Duty Emulsifying Cutting Oil excels on high-alloy aircraft steels

an emulsifying cutting oil. Piasecki Helicopter's large job S.E.C.O. Heavy Duty handles all machining jobs requiring shop at Morton, Pa., found this out three years ago when S.E.C.O. HD* replaced two expensive heavy-duty soluble oils in machining fan hubs.

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OVER THE EDITOR'S DESK . . .



STOP THIEF

It was reported that recently more than \$150,000 worth of drills and other tools were burglarized from the Chicago stock of the Union Twist Drill Company. All items were stamped with the company's name. It is believed that these drills and tools will eventually be offered for sale. Purchasing departments should be on the lookout, as it is entirely possible that they will be offered directly to manufacturers. It is suggested that anyone receiving any information regarding a suspicious offering of Union drills and tools should notify Mr. John C. Molinar, Union Twist Drill Company, 70 Monroe Street, Athol, Massachusetts (Phone Athol 2100).

KEEPING MODERN

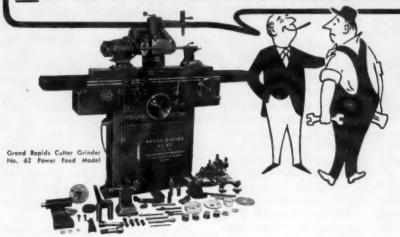
In the "Seat-O-Matic," a power accessory developed by Mercury, a control dial is mounted on the instrument panel which the driver turns until the seat moves up, down, forward or back automatically to the most comfortable position which he selects. That is his "setting." When the ignition key is turned off

the seat automatically moves to its rear position to allow for easier exit or entrance. When the ignition key is turned on again the "seat that remembers" moves automatically to the last previously dialed position or setting. A new driver taking over sets the "Seat-O-Matic" for his own particular setting and the seat moves to that position when the ignition key is turned on.

DISTRIBUTORS STRESS SERVICE

Distributors of machine tools, attending the 32nd Annual Meeting of the American Machine Tool Distributors' Association, at the Broadmoor Hotel last month attentively listened to a discussion of industrywide expansion of sales training programs which are designed to keep machine tool selling methods apace with the industry's rapid and highly diversified technological development. AMTDA President Henry Hanson emphasized to the meeting that there is no automated sustitute for efficient distribution of machine tools. He pointed out that most of the essential job of putting new industrial machinery and tools to

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OVER THE EDITOR'S DESK .



proper use can only be done by a highly skilled, well trained distribution force.

Government relations occupied an important role in the meeting's business sessions. R. A. Vidinghoff, chairman of the Association's Government Relations Committee, reported that definite progress has been made in getting Congress, as well as the Renegotiation Board, to recognize the unique position of the machine tool industry. One highlight of the Annual Meeting involved the dramatization of the industry's sales training program in the form of an actual sales meeting, the purpose being to illustrate specific "do's" and "don'ts" in sales meetings.

For a news item regarding the newly elected AMTDA officers, turn to Page 202 of this issue of *Modern Machine Shop*.

* * *

MUTUAL MANAGEMENT

Speaking recently before a meeting of the Evansville, Indiana Foreman's Club, Elisha Gray II, president, Whirlpool-Seeger Corporation, observed that the operation of a large business today is so complex that it is not possible for any one individual to be qualified in all facets of the operation. Such being the case, management decisions must flow from the bottom up.

The role of top management is to weave into an effective whole a group of specially talented people, each of whom is an expert in his own field, rather than to carry out personally all management functions. The ideal for the successful big business is an attitude where each individual has the leeway to put his best talents to work. He must be guided, of course, by a clearly defined company goal and a governing management that has the courage and aggressiveness to steer a bold course with the wisdom to know that only by true participation at all levels can success be achieved

To attract and to hold talented personnel, a large company must set up a system of remuneration, rewards and securities that will compete very favorably with anything that the most successful small business could provide. Elements in such a system should be an adequate, modern pension plan with insurance provisions, incentive profit-sharing; and a salary range competitive with other firms. A thorough method of appraising an individual's abilities should be established, and the individual should participate in periodic discussions with his supervisor regarding his progress.

The big business oriented to the individual, which bases its actions on the belief that what is best for the individuals will in most cases be best for the company as a whole, will help to create a driving spirit in its staff and provide that catalytic agent that changes an ordinary enterprise into a great one.

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OVER THE EDITOR'S DESK . .



Letters to the Editor:

Rebuilding and Converting

While reading the August issue of your magazine, the writer came across an article entitled "Converting a Grinder to Increase Production," by Bartlett West. This brought to mind the fact that we recently converted a standard vertical milling machine into a special six-spindle vertical miller, which enabled our customer to cut their production time from two hours to thirty minutes.

Would you consider this material of interest to the readers of your magazine? We believe that most of the readers of *Modern Machine Shop*—as the name implies—are primarily interested in learning about the methods employed by other concerns to reduce costs of production and shop operation, and for that reason we are taking the liberty of calling your attention to one instance in which we had a hand in helping a customer increase production in his shop.

E. J. Goris Buffalo Machinery Co., Inc. 833 Grant Street Buffalo 13, New York

• Readers of MMS are definitely interested in methods of reducing the costs of production as you would readily find out if you knew the number of readers who turn to Page 134 of this issue for a look at your description.—Ed.

Standard Costs

I would appreciate a copy of the article "Standard Costs in Accounting for Profits." This article appeared in your June issue.

J. Gleitz, Manufacturing Engineer Marquette Metal Products Division Curtiss-Wright Corporation 1145 Galewood Drive Cleveland 10, Ohio

We would appreciate receiving a copy, if still available, of the article "Standard Costs in Accounting for Profits" which appeared in the June issue of your magazine.

Joseph Lackman, Chief Industrial Engineer Wayne Iron Works Wayne, Pennsylvania

Technical Help

Just wish to tell you how interesting and useful your magazine h. 3 been to me. From its pages and by way of the Reader Service Cards I have obtained many useful ideas and information which I have passed along to my clients, referred to my associates or placed in my own files for future use.

Of course, the articles on cost control, plant layout, and other specific industrial engineering techniques have been of particular interest to me. I am passing my copies of your magazine along to a machinist friend and fledgeling machine shop owner who is putting the technical articles to practical use.

Charles E. Clark Roger R. Wilson Associates 441 North Alabama San Gabriel, California

• A grateful group in the editorial department thanks you for your comments.—Ed.

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OVER THE EDITOR'S DESK . .



Thread and Form Rolling

Would you please send us a reprint of the articles "Essential Elements of Thread and Form Rolling?" Your publication Modern Machine Shop is one of the most important factors to our firm in keeping up with the latest news from the United States relative to equipment, methods and procedures.

R. B. Martinez, Manager Mid-Continent Screw Corp. de Mexico, S. A.

Portable Mill

We are looking for a portable milling machine for such jobs as re-cutting grinder shaft keyways, face grinding groundwood decker valves, and milling holes in headboxes. One essential requirement is that we be able to bring the machine to the work rather than bring the work to the machine. The machine should have a manual feed in three directions.

E. M. Norton Coosa River Newsprint Company Coosa Pines, Alabama

• Some time ago we published a write-up on a piece of equipment which may meet your needs. The item described a "Keymil," a portable milling machine marketed by Keymill Manufacturing Company, R. D. 3, Mechanicsburg, Pa.—Ed.

Enjoy Your Work

Would you kindly forward me twelve copies of the article "Why Not Enjoy Your Work," which appeared in the October issue of *Mod*ern Machine Shop?

Bernard S. Wrablewski, Production Foreman Lectroman, Inc. 6301 Metropolitan Ave. Middle Village 79, New York

Can you furnish us with ten copies of the article "Why Not Enjoy Your Work," which appeared on page 138 of the October issue?

C. J. Sherrange Taccone Pneumatic Foundry Equipment Corp. North East, Pennsylvania

Our Superintendent, Mr. W. E. Holsinger, read aloud and with great enthusiasm at our Supervisors' meeting of October 13, the article by Alfred M. Cooper in the October, 1956 issue of *Modern Machine Shop* entitled, "Why Not Enjoy Your Work." We would like to know if reprints of this article are available so that we might have a copy to issue to each of our forty foremen. If they are not, we are requesting permission to reproduce enough for this purpose.

John F. Toole, Safety Supervisor Blaw-Knox Company Coraopolis, Pennsylvania

Will you please send us twelve reprints of your article "Why Not Enjoy Your Work," which appeared on page 138 of the October issue?

> H. J. Miller, General Manager Speed-D-Burr Corporation 3613 San Fernando Road Glendale 4, California



A tremendous hulk of cast iron may look impressive... but it adds nothing to heming...except cost! Fulmer Honing Machines are scientifically engineered to provide maximum output and accuracy at lowest cost. "Beef" is put where it's needed most, for example: in the rugged power transmission system... and "streamline" where design dictates—in the columns, for example.

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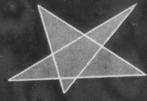


MARY C. DUE

HOWARD CAMPBELL Editor Emeritus



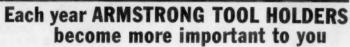
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FEATURES IN

PRODUCING BERYLLIUM COPPER COMPONENTS By Gilbert C. Close

This interesting feature illustrates and describes how the Martin-Decker Corporation, Long Beach, California, manufacturer of high quality industrial scales and weighing equipment, designs its own beryllium copper components and produces these components directly in its shops from raw stock to finished parts. Page 104.



CAN AIRFRAMES OF THE FUTURE BE MACHINED? By J. H. Famme

Based on a talk given by the author before the Second Annual Contour Machining Conference held recently in Los Angeles, the material contained in this article discusses a new barrier which, it is believed, will drastically affect aircraft design; namely, the Producibility Barrier. Page 112.



HOW A SALT MINE CUT THE COST OF

MACHINERY MAINTENANCE

By Bartlett West

Installation of a single removable block gap lathe in the maintenance shop of a salt producer in Louisiana has reduced the cost of maintenance operations to a minimum. Page 126.

LET'S SEE HOW STANDARDIZATION HELPS

This article provides a brief resume of "Dollar Savings Through Standards," a 40-page extensive survey report now being made available by the American Standards Association as a service to American industry. Page 130.

THIS ISSUE

CONVERTED MILL FEATURES SIX SPINDLE DESIGN

By E. J. Goris

A knife manufacturer—Lancaster Machine Knife Works, Lancaster, N. Y.—with the aid of a tool rebuilding firm—Buffalo Machinery, Inc.—finds a profitable method of reducing production costs in the milling of keyways in shafts and rectangular slots in knife blades. Page 134.

PROGRESS THROUGH AUTOMATION By Fred W. Vogel

A pictorial treatment of a technical conference sponsored by the Manufacturing Research Division of the International Harvester Company, Chicago, Illinois. Page 136.

GIANT MACHINE FOR MILLING GIANT AIRCRAFT PARTS

The Metalworking Division of Onsrud Machine Works, Inc., and the General Electric Company share credit for developing the world's first electronic tracer controlled milling machine designed especially to meet the National Aircraft Standard Specifications for milling airframe spars, spar caps and similar parts, Page 146.

MODERN MACHINE SHOP 1956 ARTICLE INDEX

This index provides a convenient subject listing of articles published in *Modern Machine Shop* during the current year. It is our suggestion that the readers of this magazine save this index for future reference purposes. Page 150.

VOL. 29 No. 7



(Above) Flattening beryllium copper tube

(Above) Flattening beryllium copper tube in company-designed roll flattener to give it the proper oval cross-sectional shape.

(Below) Filling bourdon tubes with angufor steel grit prior to bending the tubes.



Producing Beryllium

Scale manufacturer designs and produces own components from raw stock to finished parts.

By GILBERT C. CLOSE

In most machine shops, inclusion of a beryllium copper component in the product being manufactured means just another costly purchased part. This is not true in the shops of Martin-Decker Corporation, Long Beach, California, manufacturer of high quality industrial scales and weighing equipment. Martin-Decker engineers design their own beryllium copper components, and these components are produced right in the company shops.

"There are three good reasons for this," a company official points out. "First, it's more economical to do it this way. Secondly, beryllium copper is not a difficult alloy to work with and requires a minimum of specialized shop equipment. But most important, we can maintain rigid quality control over these beryllium copper components from raw stock to the finished part."

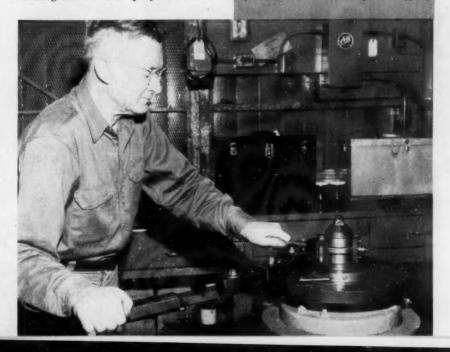
This emphasis on quality control is characteristic at Martin-Decker Corporation. The company has been in the scale manufacturing business for 30 years. The parent company

Copper Components

produces a wide line of precision weighing equipment for the petroleum industry and oil field use. About five years ago, the Industrial Division of Martin-Decker was formed to produce industrial scales. These scales run the gamut of industrial weighing units, ranging from hook scales that can be inserted between the hook of any lifting device and its load, to scales which can be mounted on a fork truck, operated from the lift truck hydraulic system, and tell at a glance the load resting on the forks.

In all cases, beryllium copper sensing units are employed in these scales. The reason why again touches upon the quality angle and derives from the fundamental characteristics of beryllium copper. With heat treatment to obtain proper precipitation of the alloying constituents, beryllium copper will attain a Brinell hardness value of 425. This means that it will undergo an extensive and

(Below) Operator at the Martin-Decker Corporation is shown bending a bourdon tube on a wipe-type bending machine. Springback is pre-established during prototype development and is said to readily remain constant in beryllium copper.



"Along with hardness, beryllium copper exhibits excellent strength and high resistance to corrosion."

repeated degree of external distortion without internal distortions that will become permanent and cause residual stresses. This single characteristic is responsible for the wide use of this alloy in high-quality springs and other instrument sensing units where shape distortion is an operating factor, but where such distortion must have no permanent effects. Along with this hardness, beryllium copper exhibits excellent

strength and high resistance to corrosion. While the alloy is somewhat costly, Martin-Decker engineers point out that its contributions to scale quality more than offset the price.

At Martin-Decker, tubular beryllium copper is used in making scale bourdon tubes. These are the curved tubes that tend to straighten out when filled with a fluid under pressure, thus imparting motion to the linkage connected to the scale dial. The bourdon tubes are sealed shut at the far or moving end and soft or silver soldered in a bronze fluid fitting at the open end. The degree of precision used in manufacturing these tubes reflects directly in the continued accuracy of the scale in which they are installed.

The beryllium copper tubing is purchased in long-length bulk lots and must conform to rigid physical and metallurgical standards and very narrow i.d. tolerances. It is stored in marked tube racks from which tubing is withdrawn when a shop order comes through calling for its use.

The bourdon tube production department is conspicious largely because of the absence of bulky and costly machinery. A quick survey indicates that complete facilities for producing beryllium copper sensing units could be set up for less than the cost of a medium sized turret lathe. Flattening rolls and a wipetype tube bender are the principal



Placing bourdon tubes in oven for heat treatment for three hours at 600 degrees F. Tubes will remain in oven to cool for 12 hours.

". . . the tubes are run through a motor-driven roll flattener to produce the required oval cross-sectional shape."

tools, but are high precision machines. Small ovens for heat treating the formed tubes, tube cleaning and testing facilities, and welding and soldering equipment just about sums up the production tools that are required.

When a production order comes through, the tubes are removed from stock and cut to lengths a trifle longer than the finished bourdon tubes will be. This is so that both ends of each tube may be sealed to hold the filler during the tube bending operation.

After cutting to length, the tubes are run through a motor-driven roll flattener to produce the required oval cross-sectional shape. This roll flattener was company-designed because commercial tube flatteners available could not produce the required narnow tolerances on the minor tube axis after flattening. This minor axis



In this illustration, an operator is shown cutting a small pinion gear on a Hamilton No. 1 gear hobber. Backlash is held within 0.002

inch. These gears transmit the lineal motion of the linkage directly from the bourdon tube into the circular motion of the dial gage.

"The springback that occurs after bending is precalculated during prototype development."

must be held within a plus-or-minus 0.0015 inch.

After the tubes are flattened and checked for proper tolerance on the minor axis, the permanently closed end is squeezed shut and soldered. The tubes are then nearly filled with a very fine, angular steel grit to prevent tube wall collapse during bending to the circular "C" shape. It has been found that this angular steel

Operator is shown adjusting a bourdon tube during assembly of a hook scale. These particular scales are accurate enough to receive Certification before delivery to the customer.

grit is the best material available for holding the required internal tolerances during tube bending. The open end of each tube is then filled with a low-melt alloy to hold the grit in place during bending.

A Di-Acro No. 2 hand-operated tube bender is used. This bender forces the tube against the mandrel with a progressive wiping action. The mandrel itself was designed by Martin-Decker engineers to meet the very close bending tolerances required. The springback that occurs after bending is precalculated during prototype development. As the springback is always constant in beryllium copper, it creates no tolerance hazard.

After the tubes are bent to the required circular "C" shape, the low-melt alloy that seals the tube is removed, and the angular steel grit is emptied out. The tubes are then placed on a flat check plate and critically straightened (through the long "C" axis) with light taps from a rubber mallet. Each tube is then washed in water, air tested at 150 pounds per square inch and then blown out with compressed air.

Then comes the critical job—heat treating the bourdon tubes so that they will maintain unwavering physical properties and shape throughout a lifetime of service distortion. Heat treatment is accomplished in small electric ovens with each tube rigidly jigged so that no shape distortion can occur. The oven temper-

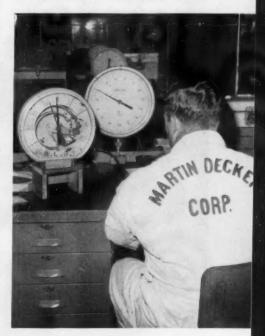
". . . linkage parts that transmit motion of the bourdon tube to the scale dial are produced by conventional methods . . ."

ature is held at exactly 600 degrees F. for three hours. The current is then shut off and the tubes are allowed to cool in the oven for 12 hours. It is during this cooling period that precipitation of the alloying constituents occur, literally locking or "keying" the slip planes in the metal together so that no internal displacement or deformation will occur when the overall part is distorted. The net result is a formed bourdon tube displaying all the constant springback tendencies that characterize beryllium copper springs and sensing units found in a wide variety of other instrument applications.

After heat treatment, the bourdon tubes are descaled and brightened in two successive solutions held at room temperature. This is followed by a rinse in water containing a detergent and then a rinse in clear water. Water spots on the bright surface are prevented by a rapid dry in an oven at 200 degrees F. Tubes that will operate in a fluid bath after they are installed in the scale are left in the bright-washed condition. All other tubes are given a dip coating of clear lacquer to provide additional surface protection.

To round out this story of producing a high quality scale, it may be pointed out that the linkage parts that transmit the motion of the bourdon tube to the scale dial, while critically sized, are produced by rather conventional shop methods using lathes, drill presses, and so on, as the operation requires. Most of these parts are made of brass or stainless steel. The weight supporting body structure of the hook scales is made from steel.

The quadrant and pinion gears used to transmit the motion of the linkage to the circular motion of the dial are hobbed on a Hamilton No. 1 gear hobber. The pinion gears are



Calibrating Martin-Decker instrument against test gage. Scales are calibrated at several points to obtain accuracy throughout range. Two bourdon tubes are used in this model.

"The use of beryllium copper in many shop-produced items has skyrocketed in the past few years."

of No. 303 stainless steel; the quadrant gears are of brass. Gear backlash is held within 0.002 inch on this machine. Ten quadrant gears are machined at one time; also, a single pinion gear.

To obtain full advantage of the inherent accuracy of the beryllium copper bourdon tube sensing unit, all Martin-Decker scales are individually bench-assembled and calibrated, with a single skilled emplovee carrying through from start

to finish. The company's "Sensater" hook scale line is so accurate, and so carefully calibrated, that it is claimed to be the only scale of its type that may be State and County Certified before it is delivered to the customer.

The use of beryllium copper in many shop-produced items has skyrocketed in the past few years. The constant trend toward even greater precision and dependability will undoubtedly continue to boost its use



A Martin-Decker lift truck scale, operated by means of the hydraulic system of the lift truck provides an immediate indication of the load that is resting on the forks of the truck.

"The simplicity of producing beryllium copper units brings the production job well within the capabilities of any shop . . ."

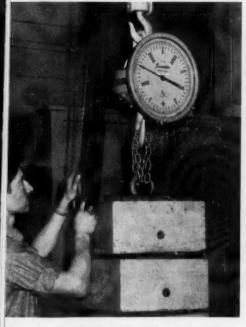
in products demanding its peculiar characteristics — especially in conjunction with the thousands of control instruments that will be needed for automation.

But as clearly evidenced in the shops at the Martin-Decker Corporation, shop operators need not fear this trend. The simplicity of producing these beryllium copper units, and the low cost of equipment involved, brings the production job well within the capabilities of any machine shop that utilizes a number of beryllium copper parts in its fabricating activities.



Thermal Power from Nuclear Reactors. By A. Stanley Thompson and Oliver E. Rodgers. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 229 pages. Cloth binding. Price, \$7.25.

Oriented to design aspects of thermal power from nuclear reactors, this book is chiefly involved with problem-solving techniques. The authors center their discussion on the generation of heat in reactors, the removal of heat and its use in thermal power plants. The new concepts and methods of analysis developed for the design of reactors are elaborated here for the specific use of engineers, resulting in detailed attention to calculations of neutron distribution. criticality and reactor kinetics. Chapter headings include nuclear considerations; reactor equations and critical mass; reactor kinetics; shielding of reactors; reactor materials; thermal stress; power extraction from reactors; and thermal power cycle. Each discussion begins at a level that is common to all branches of engineering, and each subject is developed for the purpose of deriving a useful engineering formulation which is related as directly as possible to the particular problem of using power from nuclear reactors.



Testing Martin-Decker "Sensator" Hook Scale with weights before being County Sealed.

Can Airframes of the Future Be Machined?

From a talk given by the author before the Second Annual Contour Machining Conference, Los Angeles

By J. H. FAMME

Assistant Chief Engineer, Convair (San Diego)
Division of General Dynamics Corporation

There has been considerable discussion in the industry concerning the various barriers facing aircraft designers. We hear about such things as the sound barrier, the heat barrier, and the space barrier.

I would like to discuss a new barrier which will drastically affect aircraft design. This is the Producibility Barrier. The Producibility Barrier has always been with us, but it's more acute now-because of the need for aircraft performance and reliability unheard of a few short years ago. Aircraft designers now find they are approaching a point where an improvement in design awaits the improvement of machine tools to produce those improved designs. The Producibility Barrier consists of a lack of definite means of making certain aircraft parts.

We are on the threshold of a machine tool crisis that can be eliminated to a great extent by the machine tool builder. The remaining portion of the solution must come from us. I hope my message will acquaint you with some of the engineering design problems we face now and will face again in the future.

Aircraft now in the prototype stage of development, such as the XB-58, XF-106A, and the Atlas missile, impose a strain upon manufacturing capability and technique. Examples are afforded by the problems experienced in fabrication of the sandwich panels for the XB-58, overall machining problems on the F-102 and F-106 and the welding fabrication problems on the intercontinental ballistic missile.

Aircraft design is now moving towards production of planes with speeds in excess of 1600 miles per hour. Temperature of the external surface will be of such magnitude that aluminum alloys can no longer be used. Figure 1 illustrates how the temperature rise is far out of proportion to increased velocity. These higher temperatures will require new materials to meet the heat barrier. The combination of new materials and the fabricational problems expected from the configurations of component parts promises even

greater manufacturing problems in the future.

The lead-time necessary to develop and flight test a new airplane can be shortened if the solutions to manufacturing problems are anticipated in the early stages of the airplane's design. In addition, the payoffs of manufacturing research will be realized by minimizing manufacturing costs and thereby improving our competitive position within the industry.

To cut down lead-time will require more of a partnership between the airframe industry and the machine tool builders—in fact, with all subcontractors. The trend toward overall weapons systems development makes it mandatory for prime contractors to place greater reliance upon specialized subcontractors. As a result, these subcontractors must place greater emphasis on their own research and development projects if they are to keep pace with engineering designs for five years hence.

TOLERANCES

One can't go far in a talk on aircraft or machining problems without talking about weight. Weight is an important factor in our products. It's a problem that has always been with us... and always will, and it's growing even bigger. One cause of this growth is excess tolerances.

A common complaint from shop personnel is the ever increasing close machine tolerances required by engineering. Perhaps an explanation of the reason behind these tolerance re-

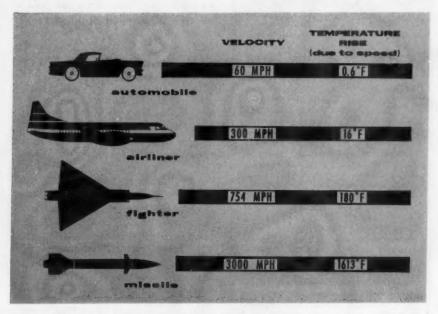


Fig. 1 — Chart showing how temperature rise is far out of proportion to increased velocity.

About the Author



J. H. (JOE) FAMME, Assistant Chief Engineer of Convair in San Diego, California, has been associated with Convair—A Division of General Dynamics Corporation-since 1936 when he began as draftsman, Mr. Famme was promoted to the position of Assistant Project Engineer in 1940 and was active in the engineering of the B-24 bomber of World War II fame. In 1942 he was made Chief Project Engineer and since April 1954 has held the post of Assistant Chief Engineer. Mr. Famme's position as Assistant Chief Engineer puts him in charge of many aeronautical design groups, including wing and tail, electrical and electronics, armament, furnishings, ground support, body, propulsion, air conditioning, acoustics, landing gear, controls, hydraulics, liaison, producibility, reliability, human factors, and so on. The project offices concerned with each model produced or planned by Convair are also under his jurisdiction together with all service engineering activities. These activities comprise field and customer cooperation, engineering service publications, operational and support planning, project specifications.

"... save weight and you increase speed ..."

quirements would be significant. Closer tolerances result in less possible weight; less weight means increased performance. For instance, a long-range bomber requires eighttenths of a pound of fuel for each pound of aircraft weight. Save a pound of weight and you not only increase the speed, but you increase the range and have a better chance of completing the mission. An interceptor can obtain an additional foot of altitude with each pound of weight saved.

Each additional one-thousandths inch per square foot adds 0.0144 pound for aluminum alloy and 0.0413 pound for steel. Considering 100 square feet of surface, this means 1.44 pounds and 4.13 pounds respectively. Figure 2 shows what effect these figures can have on a supersonic fighter with aluminum alloy skin and a wing area of 700 square feet, upper and lower surfaces totaling 1400 square feet.

This does not consider the milled areas of forgings and attachment fittings since these are milled to specific tolerances and these weight values would have to be multiplied several times. When the industry designs and builds an airplane for speeds of Mach 3 to 4, alloy steel will form these aerodynamic surfaces. Then we arrive at another set of values which will result in a serious attempt to improve the tolerance spread.

Figure 2 also shows the over-

weight penalties possible from nominal thickness for that same fighter with a wing area of 700 square feet and with steel alloy skin instead of aluminum.

Considering a bomber with perhaps a wing area of 2000 square feet, one can see that the weight problem becomes serious with extreme tolerance conditions. In fact, if the wing skin material were to be

delivered on the high side of the tolerance, the weight of a modern bomber would be increased approximately 5000 pounds. This would mean a 50,000-pound increase in weight to cover the power plant, structure, fuel, and so forth, needed in order to fly that additional 5000 pounds at the same speed, range and altitude.

It can be seen on the basis of the

OSSIBLE TOLERANCE OVERWEIGHT PENALTY ON SUPERSONIC FIGHTER	POSSIBLE TOLERANCE OVERVEIGHT PENAL ON SUPERSONIC PIGHTER
ALUMINUM ALLOY WING SKIN	STEEL WING SKIN
000 + .010 = 202 POUNDS	000 + .010 = 578 POUNDS
000 + .020 - 404 POUNDS	000 + .020 = 1156 POUNDS
-,000 + .030 - 606 POUNDS	000 + .030 = 1734 POUNDS
000 + .040 - 808 POUNDS	000 + .040 - 2312 POUNDS

Fig. 2—Diagram showing effect of weight on supersonic fighter with aluminum alloy skin and wing area of 700 feet; also, overweight

penalties possible from nominal thickness for same fighter with wing area of 700 sq. ft., but with steel alloy skin instead of aluminum.

"New materials will be necessary if we are to overcome the thermal barriers."

figures just given that even closer tolerances will be specified in the future. That means a greater machining problem. More important, it means that more equipment and heavier equipment will be necessary if machining is to continue in the same manner. New materials will be necessary if we are to overcome the thermal barrier. But what materials? What factors determine the selection of materials?

Properties to be considered come under two major classifications:

 Mechanical: Ultimate strength, yield strength, modulus, elongation, impact value, creep, and various other properties.

Physical: Density, thermal expansion, conductivity, and so on.

But a third big factor should be considered, one which we rank as

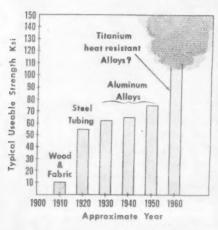


Fig. 3.—Diagram clearly depicting the evolution timetable for airframe materials.

equal in importance to the preceding two.

3. Surface: Corrosion, fatigue, temperature resistance.

Corrosion, fatigue, and temperature resistance make up a surface phenomenon which is not too well understood, but it is the fourth dimension of materials and will have an impact on the machine tool industry. It is the condition of surface finish that will affect the machine toolers-not only the surface finish requirement, but the means employed to obtain the specified finish. A metal's fatigue strength depends on the physical and mechanical properties of its outer fibers. Corrosion and high temperature resistances in many metals is the function of the surface created by the metal in its environment.

Other related factors also determine material selection:

1. Cost and Availability: These two are grouped because for aircraft construction, availability in the case of an emergency is of utmost importance. Cost per pound is not too important if the material saves weight, since material costs are a small portion of the overall cost of an aircraft.

2. Reliability: The material must meet the service requirements of the intended application. One would not use magnesium for skinning of a flying boat where protection of the magnesium from sea water attack is difficult. In other words, magnesium in sea water is not reliable.

3. Producibility: Can the present

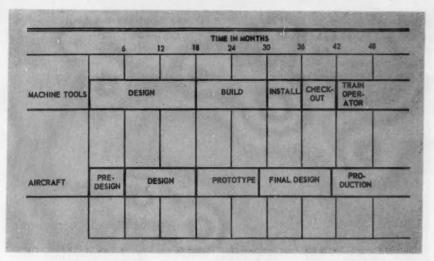


Fig. 4—Table showing lead-time from design of machine tool to training of operator to run it.

equipment and technique be used for forming and joining of the material? Heat treatable alloys are desirable because the forming may be accomplished in the soft condition and higher strength properties gained by heat treating after or during forming. This is a factor that has negated against the use of high-strength magnesium alloys. They cannot be heat treated. Their properties are gained by cold working and, once lost, cannot be restored during fabrication. Heat treatable titanium alloys are now being considered. We have great expectations of finding an alloy that can surmount the heat and producibility barriers and still give us a material which we can form.

Machine tools in the future not only must be able to remove material, but they must be able to do this without destroying the mechanical properties of the remaining surface. Physical properties can be restored by treatments but mechanical defects cannot always be restored and, being of an incipient type, may readily result in future failure without detection.

Weldable alloys are important, and it is believed that, in the future, they will be used to a greater extent in making components, rather than the machining of big assemblies. This is only a possibility, but it is one which we should consider.

While we still talk about "possible" alloys for future aircraft construction, we have come a long way in a short time. Figure 3 shows the evolution timetable for airframe materials. The materials listed indicate the major portion of the airframe, and the time periods that are given are approximate.

What does this evolution mean to the machinist? Only that the machining problem is going to be much tougher. The Air Force and the air"The report speaks of a possible 400 per cent increase in tools, power and labor."

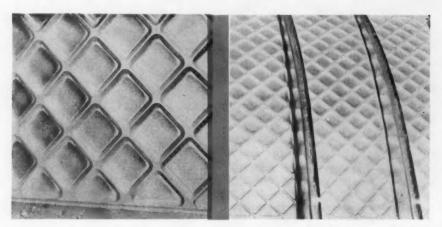


Fig. 5 — Illustration showing a section of a test panel which has been chemically milled.

Fig. 6—Illustration showing section of chemically milled integrally stiffened skin.

craft industry believe that this machining problem will be a real threat to our national security. In line with this, I refer you to ARDC report TR-56-2. Approval of this ARDC report for publication has been granted solely for the purpose of an exchange and stimulation of ideas within the industry. This summary points out that the transition from soft materials such as aluminum to hard materials such as steel for aircraft and missile construction has already begun and is progressing at an accelerated rate. This report includes some significant observations.

For example, based upon the same volume of material removed by machines, production utilizing the new hard materials will involve a 400 per cent increase in machine tools, power, and labor. This will introduce a proportionate increase in cost for the same quantity of aircraft produced or, conversely, one-fourth as many items for the same dollar value.

TOOL NEEDS

The report speaks of a possible 400 per cent increase in tools, power, and labor. Yet development of production techniques has not kept pace with weapon development. Few of the specialized tools required for this changing state of the art are in the industry's hands.

It is feared that the plastic forming of materials to minimize the need for stock removal presents so many problems and complexities that no real solution can be obtained in time. Therefore, simultaneous coordinated effort must be placed on research and development. We need

new methods of material forming and removal if the same quantity of dollar value of weapons is to be maintained.

Figure 4 shows what we're up against—a four-year lead-time from design of a machine tool to the training of an operator to run it.

The time has come to cease trying to solve these problems on an individual basis. Co-ordinated effort must be directed and controlled to obtain the results and economics necessary. Facilities, machine tools, materials, labor, and required knowledge for manufacture are factors that require attention . . . and since invention and design of weapons is expanding at a rapid pace, producibility in all its aspects should receive careful attention NOW!

NEW PROCESSES

The aircraft industry has done something about the situation by becoming a direct competitor to the machine tool industry. I am referring to the chemical milling process patented by the North American Aviation Corporation at Downey, California. This, I believe, is a remarkable application of a process that has been familiar to everyone for years, the removal of metal by etching with chemicals.

Examples of chemical milling are shown in Figures 5 and 6. The first shows a chemically milled test panel; the second, a chemically milled, integrally stiffened skin.

Two years ago chemical milling was practically unknown. Today, it is an industry worth millions with a future unlimited. This type of development is a challenge to machine tool builders and designers and must be seriously considered.

Figure 7 shows the tolerances on chemical milling. Chemical milling is applicable to forgings only in conjunction with considerable machining because of the variable nature of the tolerances involved.

Mention of chemical milling is made in passing to indicate a need for radical means of machining. We need a miracle of sorts to overcome incremental metal removal. Making chips is an expensive operation, and the product is of no intrinsic value. A good end use of chips is in order because the aircraft industry produces more chips—both in quantity and in weight—than it does parts. The production of by-products more expensive than the material worth of the airplane is not a very reasonable situation.

FORGINGS

The idea of saving machining time was one of the big reasons for the popularity of forgings. There were two other reasons — forgings eliminated combined multiplicity of pieces, and had good strength-weight

DIMENSION DEPTH	TOLERA
.000 TO .030	.004
.031 TO .060	.005
.061 TO .090	.006
.091 AND UP	.008
LENGTH AND WIDTH	.120

Fig. 7-Table of chemical milling tolerances.

"At the present, up to 70 per cent of the metal in forgings is wasted."

ratio. Forgings originally were intended to be used just as forged, except for the machining of attachment areas. After World War II, a survey team noted the German use of heavy forgings, wherein whole assemblies were forged in one piece and assembled by drilling bolt attachments. Subsequently, the heavy press program was initiated in this country by the Air Force.

Figure 8 shows how Convair gets its F-102 wing spars from giant die forgings made across the nation. Before these big forgings were made available, wing spars were built up from many small parts—plates, extrusions, forgings, rivets and bolts—some 70 parts and 800 fasteners.

Now, by incorporating these forgings into the F-102 design, Convair engineers save 120 pounds of airframe weight per plane.

But by the time the heavy presses were available, aircraft performance had increased at such a tremendous pace that the weight problem became critical and necessitated removal of all surplus material to save the original performance guarantees. We now find we have contradicted our own economy plans by the milling of forgings. At present, up to 70 per cent of the metal in forgings is wasted.

Figure 9 shows a blocker forging and the machine fitting which results from the forging. Figures 10



Fig. 8—Convair gets its F-102 wing spars from giant die forgings made across the nation.



Fig. 9 — A blocker forging and the machine fitting which results from the forging.

and 11 show a heavy press spar forging in rough and finished form. Figure 12 shows, a titanium forging, rough and machined.

The forging of aluminum alloys is more difficult than steel because of the behavior of the metal at the forging temperature and because careful die design is required.

Also, because nonferrous metals are much less ductile than steel at forging temperatures, larger forging equipment is required in producing nonferrous forgings than steel forgings of the same volume. Steel is forged near its melting point and is extremely plastic, whereas aluminum alloys are forged at a temperature proportionately much less than the melting point. All of these factors contribute to excess metal in locations not required by stress analysis.

We saw earlier (Figure 7) the tolerances on chemical milling. Figure



Fig. 10—Illustration showing heavy press spar forging (10-foot length) in rough form.

"In order to use forgings, they must be machined on all surfaces."



Fig. 11—Illustration showing heavy press spar forging (10-foot length) in finished form.

13 shows the published tolerances on aluminum forgings. None of the tolerances are suitable for the finished tolerances on forgings for aircraft use because draft, corners, and fillets give inefficient strength distribution for the additional weight factor. In order to use forgings, they must be machined on all surfaces.

MACHINING

Machine tolerances are relatively easy to hold on most operations to

plus or minus 0.010 inch. From a weight standpoint such a tolerance is unsatisfactory. A machine operator likes to work on the high side of the specified tolerance. Consequently, most machined parts tend to be on the plus side of the calculated weight, which is based on the nominal dimension. This increased weight adversely affects the original performance specifications of the aircraft.

Other difficulties plague the machinist, such as warpage and limita-

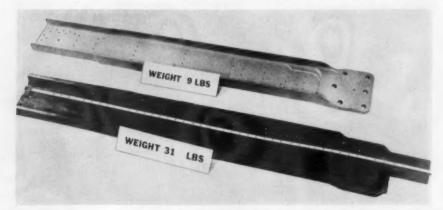


Fig. 12—Illustration showing a titanium forging in the rough and machined stage.

tion as to minimum unmachined web thickness. In this connection—just as an example—I think there might be a need for the development of a cutter that will cut both sides of a flange simultaneously. This, at least, might make a good area for the machining experts to explore.

Recognizing the problems of machining, Convair is investigating the possibility of machining forgings and other parts to an overall dimension somewhat larger than that specified, and then chemical milling all over to the blueprint dimensions. This may eliminate some of the warpage problem, and it does remove the limitation on minimum web thickness.

CONCLUSION

We've talked about problems here today that affect both the airframe industry and machine tool builders. What's the answer?

Simplification is dear to the heart of machine tool builders. But they don't always find it possible to sell single-purpose equipment to air-frame manufacturers because the air-craft industry—like other industries—desires to apply equipment to more than one task.

Your thinking, like ours, must be long-range. To a large extent, what Convair has in the F-102 in the way of materials and machining methods will be present in the F-106 interceptor and even the 880, the medium-range jet transport which we plan to have in production by 1960.

An example of the complex machining involved is shown in Figure 14—a bulkhead fitting for the F-102. Figure 15 shows how the chemical

milling process can help us. That's the leading edge of an F-106 which takes about 60 minutes to etch. Machining that part would require about four hours.

The situation boils down to this: Materials and machining will be virtually unchanged for the 880 jet transport because there is no alternative... because the machine tooler's lead-time is as long as the aircrafter's. But when we reach the stage of building airplanes for Mach 3 and 4 speeds, there will be drastic changes. New materials will be necessary, and with them, new tooling methods. The machine tool builders need to be planning now for that time.

Exactly what will be necessary would be impossible to say now. There is disagreement among even design engineers as to whether fighter airplanes will become smaller or larger . . . when wings will become stubby, solid-metal affairs or will disappear altogether.

The Aircraft Research and Test-

TOLERANCE	FORGING WEIGHT	
	1 lb.	100 lbs
DIE CLOSURE (THICKNESS)	.064	.210
LENGTH AND WIDTH TO 8 INCHES	.048	
LENGTH AND WIDTH TO 5 FEET		.360
MISMATCH	,015	.050
STRAIGHTNESS LENGTH 9 INCHES	,016 LENGTH @ ".125	
* THESE ARE ADDITIVE TO THE	PREVIOUS TOLER	ANCES
DRAFT ANGLE	3° 10 7°	3° TO 7°
CORNERS AND EDGES (APPROX.)	.060	1250
FILLETS (APPROX.)	.256	2.000

Fig. 13 - Tolerances on aluminum forgings.

"... design temperatures will possibly see a ceiling of 3500 degrees."

ing Committee of the Aircraft Industries Association recently completed a survey of leading airframe manufacturers to determine the big needs in research over the next 10 years. The committee admitted, after its questionnaires were returned, that the problems of aircraft 10 years from now are, and we quote . . . "not clearly or easily defined."

The big problem for future airframe performances, the report said, lies in the steadily increasing elevated temperature requirements from aircraft operation at higher speeds. Looking ahead 10 years, the report said that high strength cermet

development should be strongly emphasized as a possibility for a structural material.

It pointed out that design temperatures will possibly see a ceiling of 3500 degrees. At this temperature, most presently known materials will be inoperable and design philosophy will change from the improvement of materials to the protection of materials. Protective coatings and forced cooling will become the order of the day. And these new cooling systems will involve the development of such items as porous metals for evaporative cooling and hollow sections for coolant fluids.

You will agree, I believe, that ours is a mutual problem which requires more liaison between our industries. It is important for the machine tool builders to understand our situation and to realize the solutions we seek are solutions that will benefit both industries.

A good example of how this will work is the annual symposium which Convair began last year. We invite tool manufacturers and vendors to meet with our tooling and engineering representatives in a three-day session. Convair presents its problems, and the tooling experts give on-the-spot reports of what can be done.

Out of last year's symposium, for instance, came an idea that reduces the tool changing time on a production lathe setup. The saving comes about by the use of throw-away car-

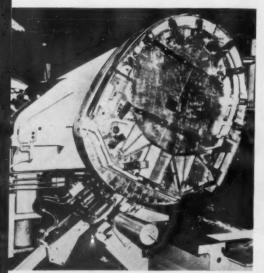


Fig. 14—Illustration showing setup for machining of bulkhead fitting for Convair F-102.

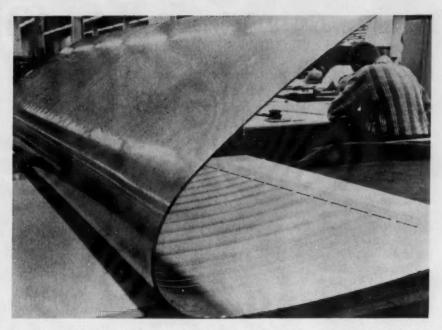


Fig. 15 — Illustration showing chemically milled leading edge of an F-106 interceptor.

bide inserts in roller-turning tools. This is the type of liaison that helps both industries.

The solutions to our problems won't come easy—or fast. But when

they do, we'll be farther ahead toward making better products, cheaper and faster. We'll also be farther ahead in our effort to break the Producibility Barrier.

* * * * * * * * * * * * *

Industrial Arts Arc Welding. By William A. Sellon. Published by The James F. Lincoln Arc Welding Foundation, Cleveland 17, Ohio. 56 pages. Price 25 cents per copy, postage prepaid in the U. S. A., 50 cents elsewhere.

This booklet introduces and relates this important process to industrial arts curriculum and suggests the methods of teaching the subject. The booklet also covers equipment, techniques, safety and projects. Also included in this booklet is an excellent bibliography of texts, references, aids and project material. The author is a welding instructor and assistant professor in the Department of Industrial Arts at Ohio University, Athens, Ohio.

How a Salt Mine Cut the Cost

Installation of a single lathe in the maintenance shop of a salt producer in Louisiana reduces cost of maintenance operations to a minimum.

BY BARTLETT WEST

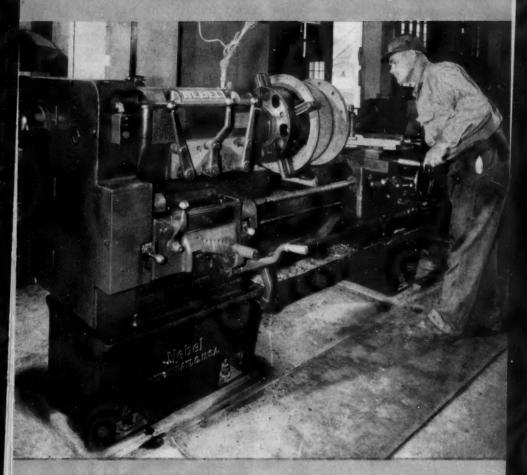
Hardly any other industry calls for more different or more difficult machinery maintenance operations than those which are found in the salt mining industry. The parts that require frequent repair or replacement include pulleys, bearings, plungers, parts for the "settlers" which are used for brine storage and chemical treatment, and equipment such as pumps, grinding mills, screens, complicated filters which incorporate moving parts to remove all but 2 per cent of moisture from a salt slurry, rotary dryers which force air at a temperature of 350 degrees F. through the salt, etc.

Inside the salt mines are pipes and valves, dynamiting apparatus, undercutting machines, hoists, and other intricate and complicated apparatus. All parts and equipment must be kept in top operating condition; repairs must be made, parts resurfaced, faced and threaded, and parts cut and shaped to exacting specifications.

For readily coping with a multitude of machining operations a wellknown Louisiana salt processor operates a total of 20 salt mills. Considerable use is made of a 16"/27" Nebel Series "LA" Removable Block Gap Lathe, manufactured by Nebel Machine Tool Corp., Cincinnati. It was originally installed because it seemed perfectly adapted to supplement a lathe department consisting of a 30 inch by 9 foot Advance, a 19 inch by 12 foot Sidney, and a 10 inch by 3 foot Regal. The Nebel is in operation no less than 30 hours per week on such materials as brass, steel iron, cast iron, bronze, monel, stainless steel, plastics, hard rubber . . . in fact, no metal or alloy has yet been found which has not been suitable for machining on the Nebel lathe.

This Nebel lathe has played an important part in the reduction and in some cases the entire elimination of costly operating equipment shut downs. For example, with some of the components of salt machines, such as strainers, wire gauges, or top feed filters which occasionally break and require repair, a new part can

of Machinery Maintenance



View of Nebel Removable Block Gap lathe chucked with a 24 inch diameter valve casting.

December, 1956

... modern machine shop

". . . it is estimated that \$15,000 in one year alone was saved . . . in routine mill work."

be machined, frequently in a matter of hours and at a nominal cost, whereas formerly the parts were machined by an outside contractor who took as much as a week's time on the replacement part. The expense encountered here became staggering when considering the loss of one salt mill operation amounts to \$200.00 per day.

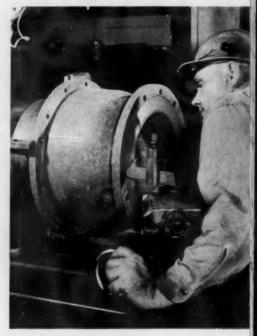
\$15,000 Saved in One Year

In round figures, it is estimated that \$15,000 in one year alone was saved through the use of the Nebel lathe in applications of routine mill work. Among the workpieces produced is a solid brass 8 inch by 10 inch agitation sleeve which is used in a vacuum pan. This vacuum pan, incidentally, is a huge closed vessel three stories high, in sets of two to four pans known in the industry as 1st effect, 2nd, 3rd, and 4th effect pans. The more pans in a set, the more salt can be produced per pound of steam fed to the various effects. When the agitation sleeves were sent to an outside contractor for machining to a required 5% inch bore, the cost ran as high as \$50.00 per piece. On the Nebel lathe, the same operation can be performed at a cost of \$16.00.

Still another area in which the Nebel lathe has proved to be a highly desirable investment is in the finish boring of shaft holes in large 50

and 60 tooth sprockets used on 80ton salt machines. Savings are effected through the purchase of sprockets having 11/2 inch bores and then completing the finish boring operations on the sprockets using the Nebel lathe.

Out of the 20 salt mills in operation, four each year are taken out of operation to be rebuilt. Through use of the Nebel lathe, it takes only eight



Close-up view showing operator machining flange of 24 inch diameter valve casting.

hours of labor in order to finish a \$1,500 mill roll, whereas formerly this particular job alone required two to three days' time.

* * *

Dynamic Factors in Industrial Productivity. By Seymour Melman. Published by John Wiley & Sons, 440 Fourth Ave., New York 16, N. Y. 238 pages. Price \$4.75.

"The level of labor productivity has far-reaching effects," Dr. Melman writes, "for the output of goods in relation to the input of production man-hours limits the possible supply of goods per person and thereby affects virtually every aspect of living." His book is an inquiry into the factors determining the major differences in industrial labor productivity. How can we account for productivity changes in a given country over a period of time? What factors cause the differences in industrial productivity which are plainly observable among major countries? What determines the replacement of manual by machine methods? Which are the relevant costs? These are among the farreaching questions examined by the author.

His inquiry leads him to test three major hypotheses. The first is that the degree of mechanization in industrial work is controlled by the ratio of alternative labor to machine cost. Dr. Melman demonstrates that this ratio has grown in a regular way in several industrial countries and that the size of the ratio accounts for the prevailing levels of mechanization. The second hypothesis is that

labor productivity is governed by the degree of industrial mechanization. This prevails in various countries, as Dr. Melman points out, and labor productivity is shown to be a direct function of alternative labor and machine cost. The third hypothesis states that the growth of administrative overhead in industrial firms has limited the effect of rising labor productivity on the output of goods per person. The author shows that the growth of administrative overhead is not correlated with the rise of labor productivity and is traceable to the extension of management's decision-making.

Dr. Melman is associate professor in the department of industrial and management engineering at Columbia University, New York City.



"Gosh, Harkbilt, you better go home! You're running quite a temperature."

DOLLAR SAVINGS THROUGH Let's See How Standardization Helps

A brief resume of "Dollar Savings Through Standards," a 40-page report issued by the American Standards Association.

Proof of the value of standardization in the field of machine tools is stressed in an extensive survey report, "Dollar Savings Through Standards," which highlights economic benefits to American industry resulting from the use of standards. The 40-page survey is being made available by the American Standards Association as a service to American industry. The report is an up-to-date version of the original edition of 1951 and contains 79 documented case studies covering 27 industrial fields.

Many of the case studies in this newest issue of "Dollar Savings Through Standards" are completely new while others have substantial revisions and additions. The time interval and change of contents combine not only to confirm earlier reports but also to expand the significant findings of the survey.

Information for the booklet was obtained by ASA through a special survey among its 114 trade association and technical society members as well as its more than 2,000 company members. And, for the first time, many of the companies referred to in the report are identified by name.

In addition to the machine tool field, other industries covered in the new booklet are mechanical manufacturing; power generation; automotive; mining and conveying machinery; mechanical fasteners; heating and air-conditioning equipment; typesetting machinery; packaging equipment; precision equipment; electrical manufacturing and electronics; electrical utilities; communications; gas utilities; railroads; building materials; iron and steel; nonferrous metals; chemical products; petroleum; rubber manufacturing; photographic and motion picture; textile; accident prevention; aluminum; modular measure; and others.

Conclusions reached from the up-to-date material are: (1) standardization is an essential element of the American industrial system; (2) American industry is thoroughly aware of the importance of standards: (3) standardization programs are found in all degrees of development; (4) there has been a sharp rise of the standards movement since World War II and particularly since 1950; (5) there has been great stress in larger industrial establishments on the importance of making the fullest possible use of standards at every stage of the productive process; (6) there is a wide variety of applications of the standards technique; and (7) there is a vast amount of work remaining to be done in standards.

Excerpts from the report which are of particular interest to the metalworking field follow:

A producer of abrasives, grinding wheels, grinding machines and refractories, The Norton Co., Worcester, Mass., reported: "Standardization activity in our Machine Division is playing a very important part in our operation. Several years ago we set up a standards section. The operation of this section has very definitely contributed to a cost savings, availability of material, flexibility in purchased equipment and a better control of production as well as delivery.

"One of our first programs was to standardize and supply such a common item as standard screws. We were able to eliminate a great number of odd size and odd length screws.

"Our study on the subject of springs brought out a tremendous advantage. We eliminated one-piece ordering . . . by setting up a standards chart with interchangeability features."

The company analyzed its savings problem and found that through transition from special to stock springs through standardization it saved \$6,466 in 1948 and \$2,622 in 1949. Estimates are that the savings have exceeded \$6,000 annually since that time.

According to the report from Norton, "Standardization of raw materials was our second best dollar-saving accomplishment. Here our primary goal was to reduce the total number of items from 773 to the lowest number consistent with our requirements. The reduction amounted to about 150 items.

"Some savings also result in im-

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". . . standardization has resulted in very great savings."

proving our product.... One of our more recent problems has been the standardization of ball bearings.... It was agreed to change certain specifications.... The results indicate a saving of \$3,700 per year, based on 1951."

The general manager of the National Machine Tool Builders Association wrote that this group has supported standardization for these reasons: (1) the great advantage to their customers in the reduction of investment in the toolroom; (2) the convenience of setting up in the shop; and (3) the assurance—as in the Machine Tool Electrical Standards—of greater safety to the machine operator.

"Today we have cutting tools that will fit any spindle of any machine," the manager reported. "Can you imagine the confusion, the delays and the rise in production costs if they did not? There is the answer. Standards, once set, remain—because they save money."

The Snow Manufacturing Co., Bellwood, Ill., produces air-tapping, drilling and threading equipment. The firm listed three steps of procedure which seem to predominate in the design of equipment. They are: Specialization, simplification and standardization.

The Snow report pointed out that "while standardization is listed last, it actually is first in importance. After standardization, the other steps follow rather naturally. . . . The foremost question to be an-

swered in design is 'how many other things could this be called upon to do?' It would seem that designing toward a standard is not so much inventive genius as a common-sense approach."

A manufacturer of multiple-spindle, drilling, boring and tapping machines - the National Automatic Tool Co., Richmond, Ind.—provided this information: "From our standpoint, we have realized savings by being able to make cabinets, panels. wire harness and conduit in stock quantities and to build for stock prior to final machine assembly. Our customers have been enabled to purchase initial machines with features to meet their immediate needs, realizing that additional features can be added when needed, with a minimum of delay and expense."

Operating on a modified lot-repetitive production control system allows a Connecticut machine tools manufacturer to permit the periodic passage of large lots to finish stores.

This manufacturer stated: "We employ the principles of mass production and interchangeable manufacturing as far as they prove economically sound.... We endeavor in all cases to use the standardization-of-parts principle in order to increase the quantity of the lots in the shop and to reduce the over-all number of parts to be fabricated.... All of the standardization we have adopted has resulted in very great savings."

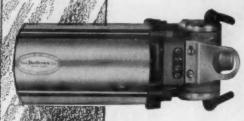
A copy of the survey containing these case histories as well as others in various fields of industry may be obtained on request from the American Standards Association, 70 E. 45th St., New York 17, New York. THIS SMALL

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The Bellows Co.

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December, 1956

modern machine shop

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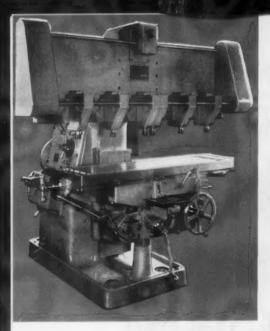


Fig. 1—Close-up view of a No. 3 Cincinnati High Powered Vertical Milling Machine which was rebuilt by knife manufacturer and converted to the six-spindle machine tool shown.

Milling keyways in shafts one at a time and milling rectangular slots in knife blades one at a time seemed like slow, laborious jobs to the superintendent of the Lancaster Machine Knife Works, Lancaster, New York. They were slow jobs, that is, until he contacted Buffalo Machinery Company, Inc., with a request that help was desired in locating a six-spindle milling machine which could be applied to those "one at a time workpiece" jobs. Buffalo

Converted Six Spindle

A knife manufacturer with the aid of a tool rebuilding firm finds a profitable way of reducing production costs.

By E. J. GORIS

Machinery informed the superintendent that to the best of their knowledge no such machine of standard manufacture was available on the market. When thus informed, the superintendent promptly informed Buffalo Machinery that he wanted them to build him one. Thus started the chain of events which led to the building of the rather unusual looking machine tool shown in Fig. 1 herewith.

Illustrated is basically a No. 3 Cincinnati Vertical High Powered Milling Machine which was completely rebuilt to the accuracies and tolerances of a new machine. The vertical head was removed and in its place on the head column was mounted a rail to which six heads were fastened with centers adjustable from 3 to 12 inches. In convert-

Mill Features Design

ing the machine to accommodate the six spindles, the same gear ratio was maintained in order to keep it standard with reference to spindle speeds and the number of feeds per inch. It is powered by means of a 10 h.p. motor mounted in the base, with push-button control at the knee, and is also equipped with power rapid traverse.

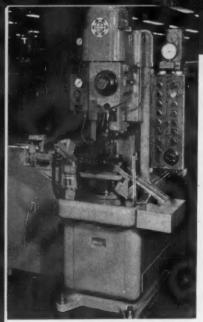
Figure 2 shows a view of the redesigned machine in operation. The blade which is being milled requires the use of five spindles set on 5-inch centers. The job requires the milling of 20 slots, each 3¾ inches long by 1⅓ inches wide. The blade itself is 110 inches long by 11/16 inch thick. Through the application of the five spindles required for this four-step setup, the entire 20 slots are milled in 30 minutes, compared to the two hours that were required with the old method of milling one slot at a time in the workpiece.

The six-spindle miller is not limited to the machining of knife blades only but can be used for many other jobs. Another practical application accomplished is the machining with six fixtures on the table at the same

time, drilling, milling, counterboring, and so on. Another example, the time required for milling oblong holes $\frac{5}{8}$ inch by $\frac{7}{8}$ inch by 3 inches center to center in a piece 80 inches long was $\frac{11}{2}$ hours on a single spindle machine, and was reduced to 20 minutes on the six-spindle converted milling machine. It is possible to cut keyways on shafts six at a time, or more if so desired, and the machine can be equipped with more spindles for light work, thereby saving many man hours and the difference in the cost of several millers.



Fig. 2—Five of the six available heads are used to machine slots in 80-inch knife blade.

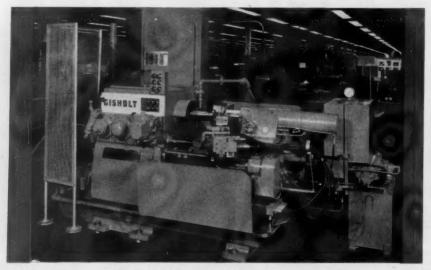


Micromatic "Microhoner" Model No. 738-C with automatic load, unload and gaging equipment.

Progress Through Automation

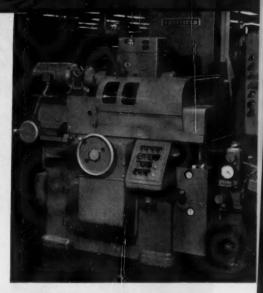
A pictorial treatment of a Technical Conference sponsored by the Manufacturing Research Division of International Harvester Company.

By FRED W. VOGEL

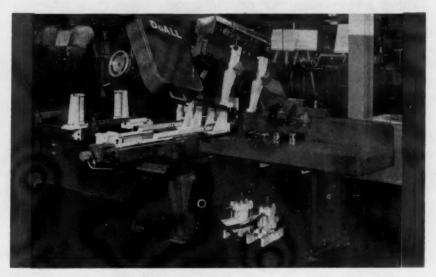


Gisholt Model No. 12 Automatic Turret Lathe equipped with hydraulic tracer mechanism.

When a company prospers and grows and operations are expanded beyond the walls of the original plant, or additional manufacturing facilities are acquired in strategic locations around the country, the problem of coordinating information within and between those facilities becomes one of tremendous magnitude. Even with all the wonderful means of communication available. it frequently happens that one division within a company will have tackled and solved a particularly difficult problem without another division, faced with the same or similar problem, ever hearing about it. In order to reduce these cases to a minimum, large companies like International Harvester with far-flung operations use all forms of communication . . . the best of these being



Sheffield Model No. 109 Raceway Grinder equipped for automatic grinding, gaging, sorting and crush form dressing of wheel.



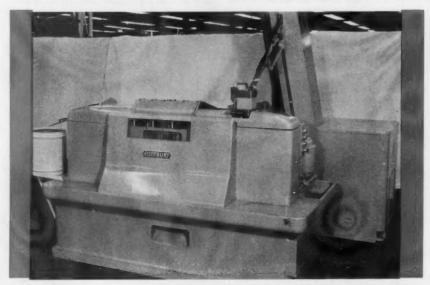
View of DoAll Model C-58 Automatic Power Saw for 12-inch rounds and 12 x 12-inch flats.



Wesson Model No. 56-B "Poweramic" Grinder.

regularly scheduled face-to-face conferences of department heads.

At International Harvester Company some months ago, during a meeting of the managerial and technical personnel, the department heads making up the Manufacturing and Research Council, the suggestion was made that a series of conferences be held to present to the technical people within the organization detailed information concerning the advanced manufacturing techniques generally referred to as "Automation." As a result, a series of conferences was set up to cover such subjects as designing the product, planning the process, selecting equipment, inspection, materials handling, and the economics involved in manufacturing. Speakers were obtained who were qualified to discuss various phases and tools of

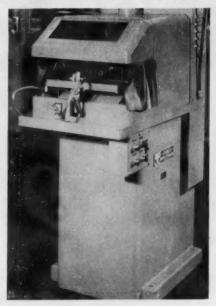


Foote-Burt Model No. 5 Continuous Broach with automatic loading and unloading mechanism.

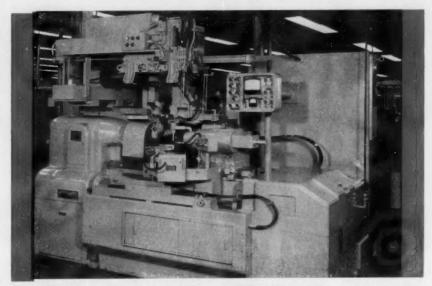
automation touching on hydraulics, pneumatics, electronics and mechanical motions.

Supplementing the conference sessions was the exhibition and demoonstration of machine tools and equipment supplied by the builders. Demonstrations were conducted to cover the latest developments and processes such as turning with ceramic tools, increased feed drilling, milling with throw-away insert tooling, "mig" welding, dump and blown shell molding, austempering, flame hardening and induction heating.

On these and the following several pages are shown a few of the very latest pieces of equipment which were on display in the Manufacturing Research building of International Harvester Company in Chicago, and were operated for both executive and technical personnel.

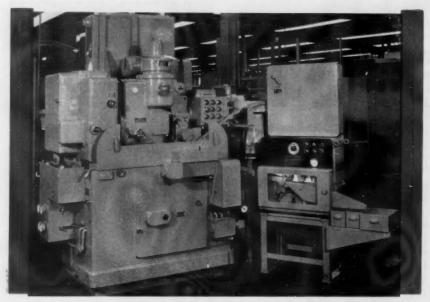


Method X Electrolytic Carbide Sharpener.

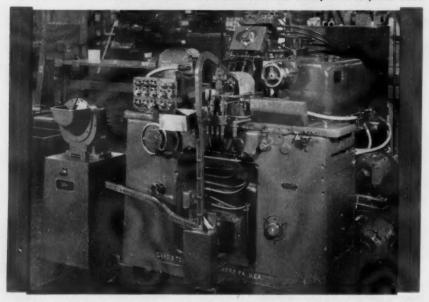


Monarch Model No. 21 "Mon-A-Matic" Tracer Controlled Lathe with load and unload mechanism.

Progress Through Automation...



Fellows Automatic Pinion Checker which checks dimensions and sorts pinions to preset limits.



Landis Model No. 2 Raceway Grinder with Krause automatic load and unload mechanism.

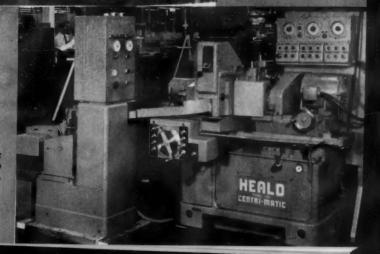
Sundstrand Autamatic Lathe with punch card control.



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Heald Centri-Matic Centerless Shoe Raceway Grinder.





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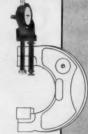
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Giant Machine for Milling

Metalworking Division of Onsrud Machine Works, Inc., and General Electric Company share credit for developing world's first electronic tracer controlled spar milling machine for aircraft part production.

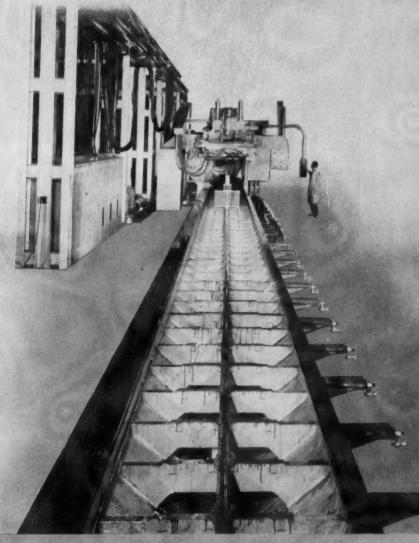
Shown in the accompanying illustration is a totally new machine which was designed especially to meet the National Aircraft Standard Specifications for milling airframe spars, spar caps and similar parts. This is the first of a group of machines by order of the U.S. Air Force. This machine, the electronic controlled Onsrud A-90-24 Automatic Contour Milling Machine, not only meets the specifications but exceeds them in terms of speeds and precision. It is a huge 84-foot milling machine for milling work up to 60 feet in length by 35 inches width.

Of particular interest are some of the elements which have been built into the machine. For example, the machine contains: 167 control stations and 24 major light signals; 38 electric motors; 36 safety control limit switches; 423 cubic feet of cabinet space housing electronic control equipment, approximately equivalent in size to a room 8 feet long by 8 feet wide by 7 feet high; 42,240 feet (or 8 miles) stranded multiplex and multipurpose wiring, in addition to the 7.4 miles of wire in the control panels of the machine.

When operating under full power. the new Onsrud milling machine consumes enough electricity to light more than 5,000 60-watt bulbs at one time. Coolant is used at the rate of 80 gallons per minute, with a minimum reserve supply of 325 gallons maintained at all times. A 16inch diameter cutter mounted on a horizontal motor rotates at a peripheral speed of 170 miles per hour. A single horizontal cutter head with 16-inch diameter cutter removes, under average load, an amount of aluminum per minute in chip form equal to \$128.00 worth of aluminum bar or plate stock. Total weight of the machine without tooling is approximately 90 tons.

Four milling heads are employed on the machine. All four heads can be operated at one time, or singly, or in any combination. Speeds, feeds and motions are individually controlled for each milling head and a total of 12 different electronically controlled movements or feeds are available, in addition to longitudinal feed. Longitudinal feed of the cutter heads under full load is from 0 to 340 inches per minute.

Giant Aircraft Parts



World's first electronic tracer controlled spar mill-Onsrud A-90-24 Universal Contour Milling Machine. Bed length is 84 feet, providing

work area for parts up to 60 feet long x 35 inches wide. Four milling heads mounted on carriage are capable of 12 different motions.





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aluminum-and ten times as long in steel.

thirds that of aluminum, permits pieces to be handled and moved from one operation to another with a minimum of time, effort and equipment. This is particularly important with large jigs and fixtures which couldn't be handled manually if they were made of steel.

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1956

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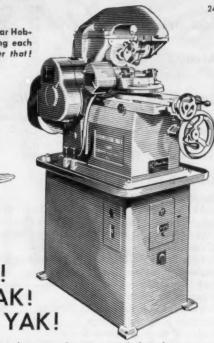
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THE HAMILTON TOOL COMPANY 828 South Ninth Street HAMILTON, OHIO



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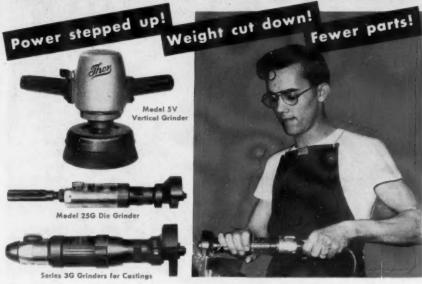
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Model 5V Vertical Grinder

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cut to 3 lbs., 11 oz., a saving of 16%, while power has been increased 18%. Also available in Series 3GE with an extension spindle to reach hard-to-get-at places.

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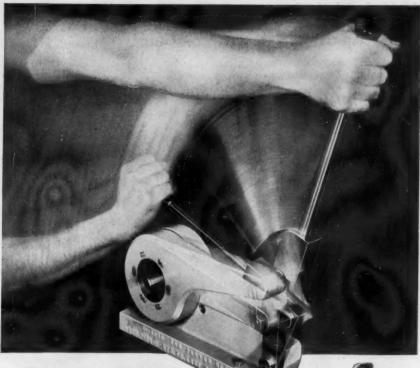
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modern machine shop

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December, 1956



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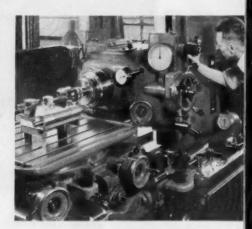
Jig Borer Features Precision Optical System

Tolerances of plus or minus 0.0001 inch are an every day affair with the horizontal optical jig borer illustrated, which is utilized in the making of high precision jigs and fixtures in the toolroom of The Warner & Swasey Company, Cleveland.

Utilizing the jig borer's special rotary indexing work table, parallel holes are machined from opposite sides of a workpiece, such as the hexagon turret hole locating fixture shown, with accuracy so close that it requires gage room instruments to verify the results, according to the company. The unusual accuracy of the machine, made by DIXI in Switzerland, is due in part to a precision optical

system which is used for the precise direct reading adjustment of tool and work location.

For more data circle 76 on Reader Service Card



Horizontal optical jig borer used by Warner & Swasey in making high precision fixtures.

164

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S. C. Johnson & Son, Inc., Industrial Products Dept., Racine, Wisconsin



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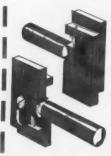
because our method of broaching square holes makes a better fit for the tool bit. This means more rigidity and longer life, especially with tungsten carbide.

Square hole sizes range from 1/8" up to and including 3/4".

TYPE "B" & "C" CUTTERS

A strong rigid serrated 2-bladed cutter-located in the bar with a taper pin. Bores holes accurately to close limits. Can be expanded and reground giving long life. Sizes 7/8" dia. up to 6".





164d

A simple 2-bladed reaming cutter. Can be expanded and reground. Located in the bar by a hardened V. This V never has to be reground as blades are expanded. Fits other bars with slots 3/4"x1/4" 5/6"x11/4" 5/6"x11/4"

THE DETROIT BORING BAR CO.

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why you
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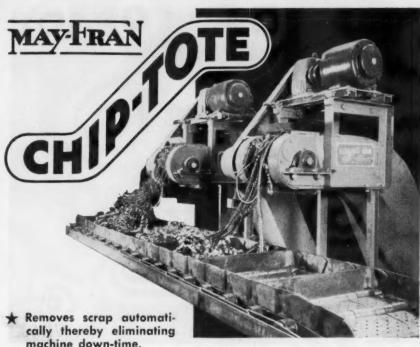
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modern machine shop

December, 1956



machine down-time.

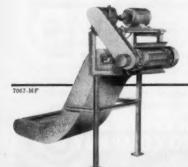
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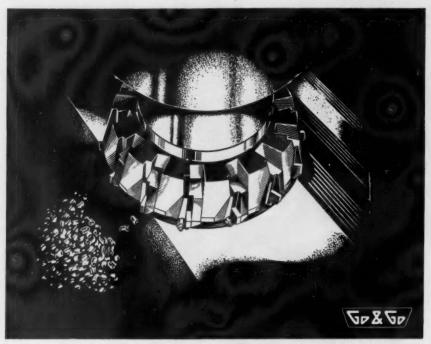
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Economical milling with carbides requires careful tool engineering. This has been recognized for many years at Go & Go. Failure to do so has soured many a carbide application.

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 Tap fits in chuck no extra head
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over hand methods. This set-up handles hundreds of drilling and tapping jobs daily. The company also uses 40 other Dumore Units to cut costs and speed output!

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For more data circle 314 on Reader Service Card

December, 1956

modern machine shop

ideas from readers

Several time-saving ideas and suggestions for the man in the machine shop.

Fitting Ball Bearings on Shaft Seats

By H. J. GERBER

In our shop we have found that a satisfactory method for the installation of ball bearings on shafts is to heat the inner bore of the bearing and then push fit the heat expanded race on the shaft seat. For the common run of small bore bearings we use a small electric soldering iron, set up as shown in Fig. 1. The tip of the soldering iron is centered through the bearing bore without actually touching the sides of the hole. Radiated heat will soon raise the temperature of the inner race to the 150-175 degrees required. This temperature can be determined easily by several trial fittings of the bearing on the shaft. When properly expanded, the bearing will drop onto the shaft seat without any force being applied.

For large bore bearings an electric light bulb provides a good source

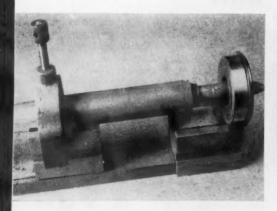


Fig. 1—Setup for heating small bore ball bearing using electric soldering iron.

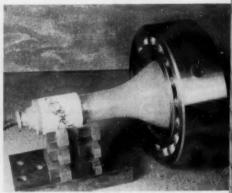


Fig. 2 — Setup for heating large bore ball bearing using an electric light bulb.

of heat which can be applied with a simple setup such as that illustrated in Fig. 2 herewith.

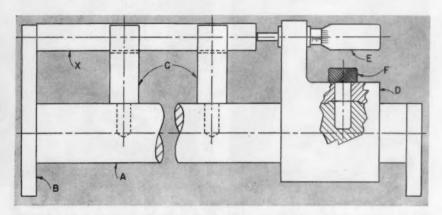
Device for Measuring Length of Long Pieces

By ALAN D. MATTHEWS

Designed by the writer for measuring the length of long pieces such as tie bars, shafts and similar workpieces which must be held to close limits, the device shown in the accompanying sketch consists of: (1) a piece of 2-inch round turned and ground steel, A, of a suitable length to meet individual requirements (in our case, 65 inches to provide a range of up to 5 feet) and having a number of equally spaced blind holes drilled therein; (2) a piece of $\frac{1}{2}$ x 2 x $4\frac{3}{4}$ inch long ground steel, B, bolted to one end of the main bar A and

against which the work X is located; (3) two V-holders, C, in which the workpiece is supported, the holders being movable from hole to hole in the bar A to suit the length of work being checked; and (4) the head, D, which accommodates a micrometer head E and which is movable from hole to hole in bar A by lifting the knurled head pin F, advancing exactly 1 inch between holes.

In use, the work X is placed in the V-holders C and the head D is advanced to the nearest hole to permit the exact length of the workpiece to be measured by the micrometer head E. In the writer's own case, each workpiece is purposely cut slightly longer than necessary (using a tape measure) in a turret lathe, measured and then returned to the lathe to remove the few thousandths as indicated by the micrometer head. The micrometer head is mounted $\frac{1}{4}$ inch off center so that all sizes of shafts may be



Sketch of handy device for use in accurately measuring the length of long pieces, such as tie bars, shafts and similar workpieces which must be held to close limits.

ideas from readers . . .

measured without the micrometer spindle entering the center or tapped hole in the end of the workpiece.

The main consideration in making this measuring device is that the distance between holes in the bar A be accurately spaced on 1-inch centers. In our shop, the entire mechanism is enclosed in a suitable wooden box which has a hinged cover and is placed on a bench near the machine in which the work is to be performed.



Dividing Head Carrier and Storage Unit

By IRA S. ROBERTS

Large dividing heads are heavy and sometimes difficult to move on and off of machinery by a single worker. These heads are precision accessories and should be adequately protected when not in use.

In our shop, in order to allow one operator to easily handle a heavy dividing head and to also provide safe and clean storage for this unit, we mount each head on a carrier of the type illustrated in Fig. 1. The carrier supports the dividing head itself on the flat top surface, which has a groove to accommodate the keys on the bottom of the head. The tailstocks unit is positioned on a shelf between the legs of the carrier, and both the dividing head and tailstock unit are provided with plywood dust covers.

To transfer the dividing head to the table of a milling machine, the carrier is rolled on its four swiveling casters to the end of the milling machine table and the knee of the miller is either raised or lowered to



Fig. 1—Dividing head carrier and storage unit. Top surface of unit accommodates dividing head itself; shelf between carrier legs provides storage for tailstock unit.

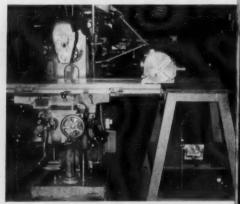
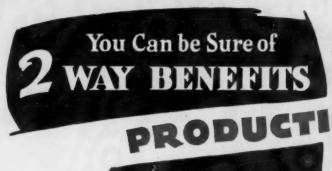


Fig. 2 — Illustration showing how dividing head can be easily slid off of the top surface of the dividing head carrier on to the adjacent level milling machine table.



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Vibratory type, to select and feed smaller fragile

SELECTIVE ARTS FEEDERS

Modern Necessities Widely Adaptable

These versatile devices not only provide the feeding operations on Detroit Power Screwdrivers, but they are being widely used on today's many special high-production machines.

WHAT IS YOUR FEEDING AND ASSEMBLING PROBLEM? WRITE US-ALSO SEND SAMPLE ASSEMBLY

Bench and Pedestal types. Pedestal Model A pictured

5 SCREW-

DRIVING

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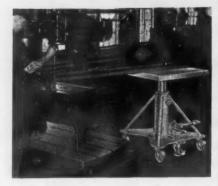
December, 1956

modern machine shop 171

RAYMOND

PORTABLE

ELEVATING TABLE



1. POSITIONS WORK

at proper height for machining or attaching

2. SUPPORTS LONG PIECES during drilling and machining operations.

3. HANDLES DIES

simplifies die transfer, installation, removal.

Does all these—and more! Hydraulically operated, highly portable. 2,000 lb. capacity. Standard Model elevates 28" to 44"; Telescopic, 28" to 50".

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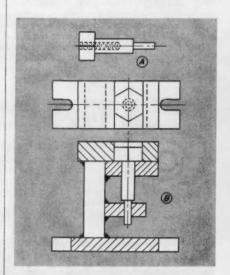
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bring the top of the table level with the top surface of the carrier. The dividing head is then slid off of the carrier and on to the miller table, as shown in Fig. 2, with no lifting involved whatsoever.

Unusual Threading

By FEDERICO STRASSER

Designed for use in threading the blind longitudinal hole of a workpiece of the type shown at A in the accompanying sketch, the fixture shown at B in the sketch is unusual in that no clamping means are used to hold the workpiece firmly during



Sketch of unusual holding fixture for threading blind hole in part shown at (A).

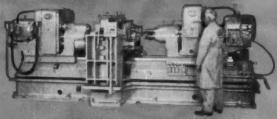
December, 1956

Drill Bore Face Tap

ON A MULTI-SPINDLE NATCO®

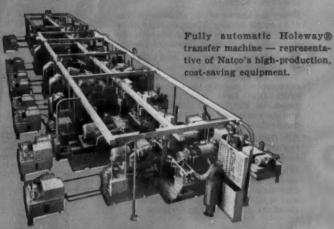
High production or job lot flexibility... Natcos range from small, light sensitive drilling and tapping machines to fully automatic, high-production transfer machines. Special machines designed and fixtured to solve specific production needs.





Way-type horizontal machines for drilling, boring, facing and tapping. Hydraulic feed, automatic lubrication to heads, individual lead screws for tapping, coolant systems with magnetic chip separators.

High-speed, light sensitive, multi-spindle drillers and tappers. Available with adjustable heads, hand and foot feed or hydraulic feed tables. 8-position automatic fixture slides and rotating tables for fixtures.



Call Natco offices in Chicago, Detroit, Buffalo, New York, Boston, Philadelphia, Cleveland and Los Angeles. Distributors in other cities.

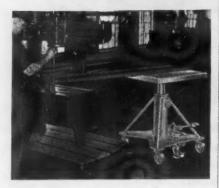
NATIONAL AUTOMATIC TOOL COMPANY, INC.



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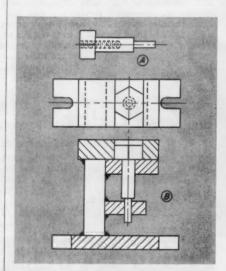
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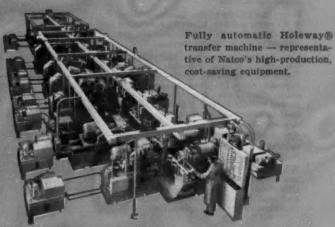
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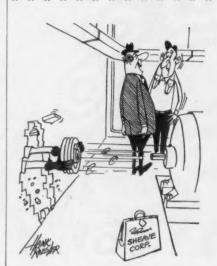
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the threading operation. Simple to make, the fixture is welded together from a few suitable pieces of cold rolled steel, as shown. Three worklocating holes are provided in the fixture—one for the small round end portion of the workpiece; another for the larger diameter center portion of the workpiece; and a third (hexagonal) hole for the hexagonal head of the piece.

To thread the workpiece, it is simply introduced into the fixture from the top and is automatically properly aligned and firmly held during the course of the entire threading operation in order to readily provide for maximum accuracy.



"Another thing you'll really like about our sheaves — they're easy on, easy off."

December, 1956

when mistakes



Automotive crankshaft being brought up to inspection standards with metallizing. This automotive manu-facturer formerly used plating for this type of sal-vage, worked one per hour. With metallizing, the salvage operation requires only 5 to 10 minutes per shaft, including surface preparation.





Get the full story on metallizing in production salvage. Bulletin 57-C describes and illustrates describes and illustrates

... and they do in any busy machine shop, there's no need to scrap a mis-machined or otherwise damaged machine part that represents an investment of many expensive man-hours. Parts like these are brought up to inspection standards quickly, easily and inexpensively

And with the new molybdenum metallizing wire, Sprabond, the only surface preparation required is cleaning. The molybdenum forms a molecular bond with the surface being rebuilt. Little heat is generated, eliminating any danger of warpage.

with metallizing.

What's more-users have found that the extreme hardness of the molybdenum coating, and its microscopic porosity which provides superior lubricating characteristics, improve its "wear-ability" over ordinary bearing surfaces as much as 25 times. You haven't just salvaged a part-you've improved it.

> The following names are the property of Metallizing Engineering Co., Inc. METCO . Sprabond Wire

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December, 1956



Now the famous Capewell line of Metal Cutting Saws has been joined by Capewell High Speed Safetech Hole Saws... manufactured to the same high standards as Safetech Power Hack Saw Blades . . . a high speed cutting edge with a soft, tough flexible back to give safe, fast cutting in even the toughest materials. Thousands of users know that Safetech Blades stay sharper longer and give more cuts per blade dollar.

Safetech Hole Saws are available from your industrial distributor in diameters ranging from %16" to 6". All sizes have six teeth per inch and are equally well suited for cutting sheet, plate or curved sections. Interchangeable arbors with adjustable pilot drills fit chucks from 1/4" to 1/4". You will find that Safetech Hole Saws are an economical means of extending the useful range of portable power tools, lathes, drills, and production line work.

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1. Contour Cutting Machine

Aaron Machinery Co., Inc., 45 Crosby St., New York 12, N. Y. Kolle Model K-16 Vertical Metal Cutting Bandsaw.

2. Meehanite Metal

Acme Tool Co., 73 West Broadway, New York 7, N. Y. Surface plates, angle plates, lapping plates, universal right angles, box parallels, flat parallels, straight edges, and so on.

3. Gears

The Adams Co., Dubuque, Iowa. Multi-Speed Reducers and gears.

4. Forgings

Allegheny Ludlum Steel Corp., Oliver Building, Pittsburgh 22, Pa. Complete data on smooth hammered forgings, composite die sections and cast-toshape tool steels.

5. Fabricated Steel Tubing

Armco Steel Corp., 1336 Curtis St., Middletown, Ohio. How fabricated steel tubing cuts costs and increases production of many products.

6. Alloy Steel

The Babcock and Wilcox Co., Tubular Products Division, Beaver Falls, Pa. Croloy 5 — an intermediate chromium molybdenum alloy steel for elevated temperature service.

7. Contour Stretch Formers

The Cyril Bath Co., 32400 Aurora Rd., Solon, Ohio. Contour stretch formers and radial draw formers.

8. Hex Keys

Henry P. Boggis and Co., 708 East 163rd St., Cleveland 10, Ohio. Ajax extension hex keys for assembling hollow head set and socket head cap screws.

9. Profile Grinders

Boyar-Schultz Corp., 2020 South 25th Ave., Dept. AK, Broadview, Ill. Profile grinders for grinding and fitting difficult contours.

10. Collet Stops

Byco Industries, 2302 East 31st St., Minneapolis 6, Minn. Self-centering 5C collet stops for second operation and lathe work.

11. Carbide Grades Chart

Chicago-Latrobe, 419 West Ontario St., Chicago 10, Ill. Carbide Grades Chart showing grades and numbers of 12 manufacturers.

12. Drilling Equipment

Commander Manufacturing Co., 4224 West Kinzie St., Chicago 24, Ill. Tapper, drill chip breaker, multi-drill, drill press turret and coolant table.

13. Shop Truck

Dayton Rogers Manufacturing Co., Minneapolis 7D, Minn. Lift-A-Load elevating table shop truck.

14. Metal Cutting Lathe

Delta Power Tool Division, Rockwell Manufacturing Co., 456 North Lexington Ave., Pittsburgh 8, Pa. Five foot bed 11 inch metal cutting lathe. 15. Hydraulic Press

The Denison Engineering Co., 1254 Dublin Road, Columbus 16, Ohio. 1 ton HydrOILic Multipress to simplify automation on many production operations.

16. Grinding Wheels

A. P. deSanno and Son, Inc., Phoenixville, Pa. Radiac Grinding Wheels.

17. Speeds and Feeds

Diamonite Products Division, U. S. Ceramic Tile Co., Canton 2, Ohio. Speeds and feeds for Diamonite oxide cutting tools.

18. Broaches

The East Shore Machine Products Co., 50 East 201st St., Cleveland 23, Ohio. Glenny adjustable push broaches.

19. Drill Presses

The Electro-Mechano Co., 265 East Erie St., Milwaukee 2, Wis. Eight inch drill presses for high-speed production drilling of very small holes.

20. Machining Process

Elox Corp. of Michigan, 1839 Stevenson Highway, Royal Oak 3, Mich. Electronic machining process for drilling, broaching, reaming, die sinking and grinding.

21. Abrasive Belt Grinders

Engelberg Huller Co., Inc., 1-3 Seneca St., Syracuse, N. Y. Various models of multiple-head abrasive belt grinders.

22. Lens Tissues

Engis Equipment Co., 431 South Dearborn St., Chicago 5, Ill., A convenient book of soft and silky lens paper for cleaning optical tooling instruments.

23. Leveling Jacks

Enterprise Machine Parts Corp., 2715 Jerome Ave., Detroit 12, Mich. Expanded line of Empco machine leveling jacks.

24. Square Spanner

Firearms International Corp., Washington 22, D. C. Polyp Square Spanner.

25. Balancing Machines

The Gisholt Machine Co., Madison 10, Wis. Problems concerning the balancing of rotating parts.

26. Cutting Oils

Gulf Oil Corp., Gulf Building, Pittsburgh, Pa. Gulfcut Cutting Oils.

27. Variable Speed Lathes

Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo, Mich. Variable speed polishing and buffing lathes.

28. Pickling Inhibitor

E. F. Houghton and Co., 303 West Lehigh Ave., Philadelphia 33, Pa. Acitrol 3129—a liquid pickling inhibitor that answers needs for lasting efficiency.

29. Turret Drill

Howe and Fant, 29 Fitch St., East Norwalk, Conn. Vertical turret drilling machine.

30. Material Handling Device Industrial East Co., P. O. Box 561, Clifton, N. J. The Bar-Lugger — a material handling device.

31. Nickel

The International Nickel Co., Inc., 67 Wall St., New York 5, N. Y. The role played by nickel in the machine tool industry.

32. Metalworking Waxes

S. C. Johnson and Son, Inc., Racine, Wis. Water soluble coolants, cutting oils and drawing compounds.

33. Dynamometer Bases

Lake Shore Engineering Co., Iron Mountain, Mich. Dynamometer bases, surface plates and engine stands.

34. Concentric Grinder

Landis Tool Co., Waynesboro, Pa. Shoe-type centerless grinding method for ring shaped parts with either straight or profiled shapes.

35. Expanding Mandrels

K. O. Lee Co., Aberdeen, S. Dak. Expanding mandrels for milling, turning and grinding.

36. Hydraulic Presses

Lempco Industrial, Inc., 5490 Dunham Rd., Bedford, Ohio. Complete line of hydraulic presses ranging from 25 to 150 tons in both manually and electrically operated models. 37. Heating Unit

Lepel High Frequency Laboratories, Inc., 55th St. and 37th Ave., Woodside 77, New York City, N. Y. Model 2KW high frequency heating unit.

38. Arc Welder

The Lincoln Electric Co., Cleveland 17, Ohio. Lincolnweld versatile submerged arc welder.

39. Lubricating Unit

Logansport Machine Co., Inc., 801 Center Ave., Logansport, Ind. Model 600 combination regulator, filter and lubricating unit for use in connection with pneumatic applications.

40. Pins

Robert A. Main and Sons, Inc., 28 Pascack Rd., Paramus, N. J. Pins and pointed wire products.

41. Rotary Burs and Files

Martindale Électric Co., Box 617, Edgewater Branch, Cleveland 7, Ohio. Information concerning high-speed steel rotary burs and files.

42. Sintered Carbides

Metal Carbides Corp., Youngstown 12, Ohio. Sintered carbides, hot presses carbides, cutting tools, drawing dies and wear resistant parts.

43. Moving Dollies

Mighty Mover Co., 1701 East Louisiana, Denver 10, Colo. Heavy-duty moving dollies.

44. Solvent

Harry Miller Corp., Fourth and Bristol Sts., Philadelphia 40, Pa. Immunol, the non-alkaline, non-acid detergent and rust preventive that cleans, degreases and rustproofs metal in one operation.

45. Thread Triangles

Montgomery Tool Co., 7 Tichenor Lane, Newark 5, N. J. Information on thread triangles, which are hardened, precision ground gauges in the form of two 60 degree triangular bars.

46. Circular Sawing Machine

The Motch and Merryweather Machinery Co., 1250 East 222nd St., Cleveland 17, Ohio. No. 00 circular sawing machine for ferrous and non-ferrous metals.

47. Notcher and Punch

Niagara Machine and Tool Works, Buffalo 11, N. Y. Versatile Model 65-5 Air Power Notcher and Punch.

48. Abrasives

Norton Co., Worcester 6, Mass. "Barrel-Finishing with Norton Tumblex Abrasives."

49. Marking Machine

Parker Stamp Works, Franklin Ave., Hartford, Conn. No. 710 Hydraulic Marking Machine.

50. Duplex Rotary Fixture

Pratt and Whitney Co., Inc., 25 Charter Oak Blvd., West Hartford 1, Conn. Duplex rotary fixture, right and left fixture, depth template attachment and adjustable model fixture.

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Production Machine Co., Greenfield, Mass. Centerless grinding, polishing and finishing method using abrasive belts.

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Geo. Scherr Co., Inc., 200-MM Lafayette St., New York 12, N. Y. Complete line of precision instruments and tools.

53. Paper Towels

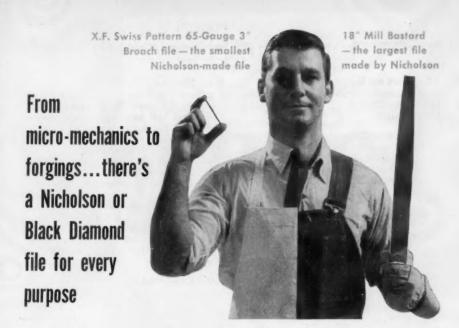
Scott Paper Co., Chester, Pa .Complete line of paper towels.

54. Accessories

The Sentry Co., Foxboro, Mass. Diamond blocks, cover plates, muffles, trays, baffles, tongs and so on.

55. Grinding Wheels

Simonds Abrasive Co., Philadelphia 37, Pa. Crankshaft grinding wheels.



You may not finish miniature dies or components by hand in your plant. And you may not dress huge forgings. But there's a Nicholson or Black Diamond file that's exactly right for each of these uses—and for every file use in between.

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Size Control Co., 2500 West Washington Blvd., Chicago 12, Ill. Before-plate thread gages.

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The Skinner Chuck Co., 210 Edgewood Ave., New Britain, Conn. "Junior" Power Chucking Unit speeds production on small lathes.

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Sohio, Industrial Lubricant Division, Medland Building, Cleveland, Ohio. Sulkleer Cutting Oils.

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South Bend Lathe Works, South Bend 22, Ind. Ten inch swing toolroom lathes.

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Spitfire Tool Co., 2931-35 North Pulaski Rd., Chicago 41, Ill. Precision roller lapping machine.

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The Standard Electrical Tool Co., 2487 River Rd., Cincinnati 4, Ohio. Super precision milling spindles designed for milling, boring, routing and drilling operations.

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Standard Pressed Steel Co., Box 556, Jenkintown 22, Pa. Self-locking Unbrako socket screws.

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Stewart-Warner Corp., 1826 Diversey Pkwy., Chicago 14, Ill. Dynamic balancing machines.

65. Cutting Machines

Stone Machinery Co., Inc., 131 Fayette St., Manlius, N. Y. Cutting machinery for ferrous and non-ferrous metals and other non-metallic metals.

66. Chucks

Supreme Products Corp., 2222 South Calumet, Chicago, Ill. Supreme brand plain and ball bearing chucks, arbors and Versamatic.

67. Template Bushings

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68. Dust Separator

Torit Manufacturing Co., 296 Walnut St., St. Paul 2, Minn. No. 19-FM-55 Dust Separator for tire buffing, woodworking and other large quantity dust collection.

69. Seal Fitting

Tru-Seal Division, Flick-Reedy Corp., 2024 North Hawthorne Ave., Melrose Park, Ill. Tru-Seal—a pipe thread seal fitting that assures perfect sealing of pipe thread elements.

70. Dermatitis

West Disinfecting Co., 42-16 West St., Long Island City 1, N. Y. "The Control of Dermatitis in Industry."

71. Perforating Die

S. B. Whistler and Sons, Inc., 740 Military Rd., Buffalo 23, N. Y. Ten hole magnetic perforating die.

72. Machine and Hand Tools

Whitney Metal Tool Co., 720 Forbes St., Rockford, Ill. Punches, shears, presses, brakes and small tools.

73. Turret Punch Presses

Wiedemann Machine Co., Dept. 339, 4219 Wissahickon Ave., Philadelphia 32, Pa. Interesting booklet entitled "How to Cure Piercing Headaches."

74. Multiple Drill Head

Wisconsin Drill Head Co., 4983 North 124th St., Butler, Wis. "Quick Change" Adjustable Multiple Drill Head is entirely gear driven. Standard models available with 2 to 8 spindles.



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"W" Working Accuracy Blocks: +.000008", -.000002" per inch of length, with flatness and parallelism held within .000006".

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REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE UNITED STATES AND CANADA

news of the industry

New plants and expansions . . . company name changes . . . new appointments.

CHARLES E. BUNTING

Charles Edmund Bunting, chairman of the board of The Bunting Brass and Bronze Co., Toledo, Ohio, died recently at his home in that city after a long illness.

Mr. Bunting was born in 1886, being the youngest of three sons of William H. Bunting, founder of the company in 1907. Starting as assistant manager of the company in its fledgling days, Charles E. Bunting became president in 1928 and chairman of the board in 1946.

Under Mr. Bunting's leadership, the firm's plant in Toledo has been expanded and modernized and is among the leaders in the sleeve bearing field. More recently the company acquired the Detroit Sintered Metals Corporation, which is a wholly owned subsidiary with a new plant located in Kalamazoo, Michigan.

STERLING FOUNDRY ACQUIRES BROWN INDUSTRIES

The Sterling Foundry Co., Wellington, Ohio—subsidiary of The Warner and Swasey Company, Cleveland—has acquired in excess of 90 per cent of the outstanding shares of Brown Indus-

tries, Inc., a foundry which is located in Sandusky, Ohio.

It was stated that the purpose of the acquisition was to have larger foundry capacity available for the needs of Warner and Swasey's expanding machine tool business. Sterling has been a large supplier of castings and, in view of future demand, could not alone take care of Warner and Swasey and Sterling's other customers as well. The acquisition of Brown Industries will assure an adequate castings supply for Warner and Swasey and also enable both Sterling and Brown Industries to continue to give good service to other customers. Brown Industries will be operated as an independent unit under Sterling Foundry Company management.

NORTON BEGINS CONSTRUCTION ON NEW BUILDING

Construction on a new two million dollar, two story, central service building began recently at Norton Company's Worcester, Massachusetts plant. The completely modern three and one-half acre factory and office building will centralize under one roof the plant's engineering department and a variety of crafts which service the entire plant. Also included in the new building will be a cafeteria with seating capacity for 600 people, and a new central commissary where food will be prepared for serving at the company's six cafeterias. The building will be located on New Bond Street, adjacent to the present factory service building, which will be taken over by the Stores Department when this building is vacated.

The first floor of the office building will house the cafeteria and commissary. The cafeteria has been designed to permit its use as an auditorium for meetings and as a banquet hall. Special conveyors will be installed on which patrons can place trays of used dishes to be taken directly to the dishwashing stations. The new location will provide easier handling of food containers by truck to other cafeterias.

The plants engineering department will occupy the second floor of the office building. The drafting room, 50 x 180 feet, will feature the most modern lighting equipment which will provide 100 foot candles of light at the work-

ing area. This will be high intensity, low glare light provided indirectly from the ceiling to duplicate as nearly as possible natural daylight. The second floor will also include engineering offices, the equipment engineering department and the routing department, which issues work orders to the several crafts which will work in the new factory area.

The factory area will house the machine shop, sheet metal shop, equip-



Polishing shaft bearing surface with Schauer Type NA2C Speed Lathe.

These versatile, low-cost machines handle an almost unlimited variety of work — deburring, lapping, trimming, polishing—on metal and plastic parts. Thousands in use. Many sizes and models with holding devices to suit the job. Speed production with Schauer Speed Lathes. Write for Catalog No. 530.

SCHAUER MANUFACTURING CORP.

4501 Alpine Ave. . Cincinnati 36, Ohio

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ment repair department, conveyor department, carpenters, painters, welders, pipers, electricians, masons and tinsmiths. At the present time, many of these crafts are located in separate buildings. When the building is completed in 1958, they will be brought under one roof for the first time.

The layout of machinery in the factory area has been planned to provide as nearly as possible a straight line flow of material through the various machining operations to reduce handling and trucking of work. A truck dock will be located inside the building to permit unloading by an overhead crane. The building will also be served by a railroad siding. The siding tracks will also be extended to provide service to the present factory

service building when this particular building becomes a storehouse at some future

date.

The office will be of brick construction. The factory building will be of brick up to the window level and an aluminum sheathed cellular insulating panel will be used as siding above. The roof will be of non - combustible material. The office and cafeteria spaces will be airconditioned and the factory spaces will be equipped with ventilation. which will insure several changes of clean fresh air per hour.

A p p r o x imately 500 people will be employed in the new building, upon the completion of this very modern building.



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RADIAC®

TYPE "JH" ABRASIVE CUT-OFF MACHINE

FOR WET CUTTING ONLY

CUTTING HEAD OPERATES
EITHER MANUALLY OR
HYDRAULICALLY - - WITH
VARIABLE FEEDS & STROKES

Increases production through ease of operation



Photo through courtesy of Standard Pressed Steel Co., Jenkintown, Pa.

Operated by a 10 H.P. Motor and using an 18" Rubber Bonded RADIAC Abrasive Blade, this de Sanno Type "JH" Abrasive Cut-off Machine introduces new production economies and operating efficiency. Its hydraulically operated cutting head reduces operator fatigue. It features a foot treadle for operating the work vise, and an emergency reversing rod with mushroom button. Specially designed for production cutting of steel bars up to 2%" D., and tubing up to 4" O.D.

There are 10 other types of RADIAC Cut-off Machines—and a complete line of Abrasive Cut-off Blades—to meet your specific requirements. Write for illustrated Bulletin today. Exclusive dealers located throughout the United States.

Use RADIAC Blades with RADIAC Machines

A.P. DE SANNO & SON

PHOENIXVILLE PENNA., U.S.A.

Manufacturers of Abrasive Cut-off Machines • Abrasive Cut-off Blades • Grinding Wheels

For more data circle 326 on Reader Service Card

BROWN AND SHARPE REORGANIZES MANAGEMENT STRUCTURE

In a far reaching reorganization of its management structure, Brown and Sharpe Manufacturing Company recently announced new posts for its senior officials and a large number of new assignments for its plant and field personnel.

Wallace B. Bainton will assume new duties as vice president and general manager for Machine Tools, and Wallace E. Anderson will become the company's new vice president and general manager for Industrial Products. Mr. Bainton had formerly held the title of vice president—production and engineering, and Mr. Anderson the post of general sales manager.

The new appointments are a part of a program designed to provide greater mobility to the organization and more clearly defined lines of profit responsibility.

In the future, the company will be organized as two largely independent product divisions. to be known as the Machine Tool Division and the Industrial Product Division, each complete with its own separate engineering, production and field sales organizations.

The offices of controller, purchasing and credit management, and the office of the company secretary remain, as before, under Frederick P. Austin, Jr., the company's vice president and treas-



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TO MEET AND BEAT HIGH PRODUCTION COSTS

compare the blades you're using with **STAR**

THE STAR BLADES GIVE ALL 5

- 1. Uniformity in fabrication
- 2. Proper Hardness
- 3. Efficient Tooth Design
- 4. Sufficient Set for Clearance
- 5. Clearly marked for Ease of Identification





All saw blades are made by a step-by-step process. But the finished blade will be perfect only if each preceding step is perfect. Star Blades are uniformly perfect because every step in the Star manufacturing process is done on super-accurate automatic machines—under the supervision of highly skilled operators.

Nos. 10 & 15

No. 10 - Green molded handle. Almost indestructible. Shaped for comfort. Patented Lever-Lock positions, tensions blades automatically. No. 15 - Red molded handle, chrome-plate finish. Same features as No. 10. 100.20

Clamson Bros., Inc. Middletown, N.Y., U.S.A.

Long a favorite with mechanics, this gunmetal finish adjustable pistol-grip frame with lever for lock blade features extra easy blade change.



STAR BLADES

CLEMSON BROS., Inc., Middletown, N. Y., U. S. A.
Makers of Hand and Power Hacksaw Blades, Frames, Metal and
Wood Cutting Band Saw Blades and Clemson Lawn Mechines

| Please send the STAR Metal Cutting Guide that contains in formation on blook types, cutting formation on blook types, cutting formation on blook types, cutting formation. Feeds and speeds and general metal outling information. | Please sond the STAR Metal Cutting Chart—A handy guide for the shop metal worker.

For more data circle 328 on Reader Service Card

urer. One important new post was created under the treasurer, however, with the naming of Joseph E. Kochhan to new responsibilities as the director of systems and audits.

Aiding Mr. Bainton as general manager of the Machine Tool Division will be Charles M. Evans, manufac-

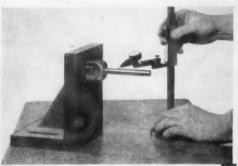
turing manager; Harold S. Sizer, director of design-machine tools; and Alfred L. Hurst, assistant to the vice president and general manager.

The sales effort of the division will be under the personal direction of Mr. Bainton, with the assistance of Thomas F. MacLaren as director of field sales; James Meehan, director of milling and grinding machine sales; and Alfred R. Sparrow as director of screw machine sales. George F. Patter-

son will assume new duties as production planning and order service manager for the division.

The Industrial Products Division under Mr. Anderson will be staffed by William A. McGregoras manufacturing manager, Kenneth V. Gordon as director of production ordering. and Harold B. Schott as general sales manager. Mr. Schott will have as his field sales director Victor S. Lindstrom, and as newly appointed director of precision tool and gage sales, William T. Nystrom. The sales effort will be further supported by three sales supervisors, Colin Sharp for metal cutting tools, J. Arthur Lord for





Patent Pending No. 516710

MAGNACHECK saves time and labor, cuts inspection costs

Positively proves angle of deviation from true horizontal or vertical. Powerful permanent Alnico magnet holds Magnacheck firmly on surface to be checked. No clamping—self-proving—positive and accurate—a non-magnetic stainless steel checking tool you can't afford to be without. Comes complete with storage case.



MAGNA-LOCK, INC., Big Rapids, Mich.

For more data circle 329 on Reader Service Card





Here's why Blanchard Wheels are best for Blanchard grinding

Almost thirty years ago, Blanchard began developing and manufacturing better grinding wheels for Blanchard Surface Grinders. Our research first produced silicate bonded wheels, and then resinoid bonded wheels.

Today, Blanchard offers silicate, resinoid and vitrified bonded wheels...scientifically manufactured and accurately graded in our modern wheel plant. Use Blanchard Wheels on your Blanchard Grinders. The correct wheel gives you peak production and economy on each job . . . whether the work is tough as copper or fragile as glass, whether it requires heavy roughing cuts or precision grinding within .000010" of absolute flatness and surface finish of I micro-inch.

PUT IT ON THE BLANCHARD

THE BLANCHARD MACHINE COMPANY

64 STATE ST., CAMBRIDGE 39, MASS., U. S. A.

THE BLANCHARD MACHINE COMPANY 64 S	tate St., Cambridge 39, Mass.	MMS
Please send "The Art of Blanchard Surface Grin	nding" (3rd Ed.)	
NAME .	STREET	
FIRM		

For more data circle 330 on Reader Service Card

December, 1956

modern machine shop

191

pumps, and Stuart F. Hall for screw machine tools.

Among many changes in the production organizations of both divisions, Ermand L. Watelet was named to succeed Mr. McGregor as superintendent of the precision tool and gage group, and Duncan H. Doolittle took on newly created responsibilities as superintendent of the miller and grinding ma-

chine group. Mr. Doolittle's former post of director of manufacturing engineering will be filled by T. C. Roberts.

* * *

ETTCO TOOL COMPANY CHANGES NAME

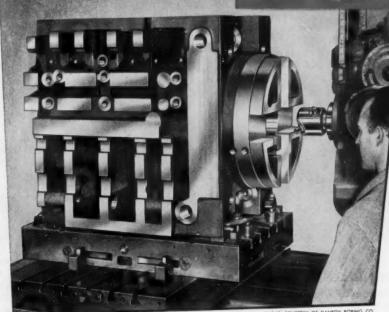
Ettco Tool and Machine Co., Inc., is the new name for the 45 year old Brooklyn manufacturer of Ettco-Emrick drilling and tapping equipment. Ac-

> cording to a company official, the somewhat longer name is more descriptive of the full scope of lines presently being manufactured.

Ettco now builds a complete line of machines for small hole drilling and tapping both standard and special - as well as older tool and attachment lines. In the past 12 months plant facilities have been doubled to handle the larger volume. This is part of a continuing expansion plan begun two years ago which included purchase of new automated machinery, new methods and training of an enlarged personnel to give better service to customers.



DIFFICULT JOBS ARE routine on



DeVlieg SPIRAMATIC JIGMILS permit accurate machining of workpiece from 4 sides at 1 setting!

The above photograph, taken in a well known Detroit Tool Shop, illustrates a Special Hydraulic Fixture being machined on a DeVlieg Model 3B-48 SPIRAMATIC JIGMIL. This job was completely machined on four sides at one setting to precise limits of accuracy and operations included drilling, boring, milling and O.D. turning 22" diameter trunnion.

Come to Detroit ... See a practical demonstration of the JIGMIL Technique

DE VLIEG MACHINE COMPANY

450 Fair Avenue, Ferndale • Detroit 20, Michigan

For more data circle 332 on Reader Service Card

ENGINEERING AWARDS

The James F. Lincoln Arc Welding Foundation, Cleveland, Ohio, has announced awards in its engineering undergraduate mechanical and structural design competition. Wayne Quinton of Seattle, Wash., received the First Award of \$1,250. Mr. Quinton, a junior last year in the Mechanical Engineer-

ing Department of the University of Washington, designed a small arc welded air compressor for home use. As further professional recognition honoring Mr. Quinton, the Foundation also granted \$1,000 in scholarship funds to Mechanical Engineering Department of University of Washington.

The awards represented top honors in this annual national competition. A total of 46 awards were made to students in 29 different engineering

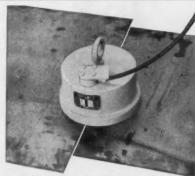
schools. They were made to engineering undergraduates for their mechanical or structural designs in which are welding was used. Designs ranged from small machine parts to large bridges.

The Second Award went to John Tierney and Karl Bartzsch of New York, who as civil engineering seniors at Cooper Union in New York, designed a welded Wichert plate girder to compare it for savings with an existing riveter girder on a Rariton River bridge. They shared \$1,000 and Cooper Union received, in their honor, scholarship funds of \$500.

Richard Moran of Canton, Ohio, as a civil engineering senior at Geor-

1156

STEARNS
"Hoist-Clamp"
Magnet Pays
for Itself...



ON DOZENS OF LIFTING-HOLDING JOBS

Clamp for Tack Welding

This handy Stearns magnet holds plates firmly in place for tack weldings — saves time and labor — eliminating misalignment. Equally valuable for welding I-beams together, dozens of other welding jobs.

Hoist for Die Blocks

Heavy die blocks and other small but heavy parts can be lifted, positioned and placed quickly and easily with the Stearns "Hoist-Clamp" Magnet.

Quick On — Quick Off

Hoist-Clamps speed work. Magnet is energized or de-energized just by turning current on or off. No slings, hooks, etc., are needed.

Five low-cost sizes—available in 4, 7, 10, 12 and 15-inch diameter sizes. Maximum lifting capacity -5,000 lb. Smallest weighs 7 lb, largest 180 lb.

Write today for bulletin 135-D.



STEARNS MAGNETIC PRODUCTS

A DIVISION OF THE INDIANA STEEL PRODUCTS COMPANY • VALPARAISO, INDIANA
664 South 28th Street • Milwaukee 46, Wisconsin

For more data circle 333 on Reader Service Card



Holds thickness tolerance to limit of .0005 in. production-machining ground flat stock!

Many people still think of surface grinding as a toolroom or finishing operation. But here's an example of Mattison Surface Grinders on high-production jobs also.

WARPLIS precision-ground flat stock, used in the manufacture of dies and precision machinery, is ground to a standard thickness tolerance of ± .001 in. Many special jobs require a total tolerance to .0005 in.

These tolerances are easy to hold on the "Mattison"—a machine that is built to

handle a wide variety of large or small parts at stock removal rates you never thought possible on a surface grinder. Shoulder and edgework are ground easily, interrupted surfaces are held to close tolerances due to adequate wheel clearance and spindle construction.

You'll be surprised at the number of jobs in your shop you can do faster and better with a "Mattison." Write for "Setups," a booklet describing the wide variety of jobs being ground in large and small shops.



High-Powered Precision Surface Grinders MATTISON MACHINE WORKS Rockford, Illinois, U. S. A.



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NATIONAL ACME IN U.S. A. BY AND SERVICED DISTRIBUTED

A Single Spindle Automat SPEEDS PRODUCTION of





SMALL PARTS INTRICATE



5/16-in. long, 6-32 brass machine screw with slotted head produced at the rate of one every 1-1/4 seconds (48 per minute). Petcock valve body machined from 7/16-in. square steel stock--turned, formed, two threads, and tuppedfotal time, 26 seconds.



spindle automatic, splash guards removed to show screw slotting attachment to which part is automatically fransferred after cut-off following

> standard attachments. Thus maximum operating flexibility is maintained at all times to insure Productive capacity includes those parts that for a wide latitude of machining operations with trouble-free continuous high volume output. B.S.A. single spindle automatics are designed

equipment for II B.S.A. models are inter-Special tools and attachments further increase require the most ricrate automatic machining. Tools, toolh ders, cam blanks and similar changeable with andard American tooling. the range of application of these machines.

Built in 5 sizes—rated capacities, 1/2-in. to 2-in.; For general specifications, write for Bulletin B.S.A.-54.

A CHIOMONIA

THE NATIONAL ACME COMPANY, 183 EAST 131ST STREET, CLEVELAND 8, OHIO

SALES OFFICES: . Newark 2, New Jersey . Chicago 6, Illinois . Deholt 27, Michigan

gia Institute of Technology in Atlanta, compared a conventional riveted building frame with a welded rigid frame designed according to the relatively new theory of plastic analysis. He received \$500 while the Civil Engineering Department at Georgia Tech received \$250 in scholarship funds.

MOTCH AND MERRYWEATHER ELECTS PRESIDENT

Announcement was made recently that the directors of The Motch and Merryweather Machinery Co., Cleveland, Ohio, have elected Richard W. Banfield to succeed Charles B. Lansing as president and chief executive officer. Mr. Banfield was formerly executive vice president and director of

Niles - Bement - Pond Company, which he joined in 1935 as a special apprentice shortly after graduation from Dartmouth College.

Motch and Merryweather is a large distributor of machine tools, having offices in Cleveland and branches in Cincinnati, Detroit and Pittsburgh. The company also manufactures machine tools and metal cutting tools which are sold

NOW AVAILABLE IN DECIMAL SIZES! chmarje CARBIDE STUB SCREW MACHINE REAMERS FAST **DELIVERIES OF** THE EXACT SIZE YOU WANT! Better finish . . . greater accuracy . . . lower tool cost! Write today for specifications and prices. SCHMARJE TOOL COMPANY Carbide Reamers • Form Tools



internationally.

Richard W. Banfield

For more data circle 337 on Reader Service Card

making big "CATS" pure



Like so many other manufacturers of precision products, Caterpillar Tractor Co. of Peoria, III., uses Lehmann-Fulton Boring Bars.

Above you see the bars boring a block for cylinder liners used in their D386 and D397 diesel engines. Lehmann-Fulton bars rough and finish bore for a close tolerance fit of the liners.

Whether your boring operation is routine or special, call on Lehmann-Fulton's 37 years of industry-proved engineering and designing skill.

Specify Lehmann-Fulton Boring Tools to help cut your machinery time to a minimum and to stop costly errors in tool setting.



SEND FOR YOUR FREE CATALOG TODAY... NO OBLIGATION, OF COURSE

LEHMANN BORING TOOL

DIVISION OF FULTON IRON WORKS COMPANY 4235 DUNCAN AVE. • ST. LOUIS 10, MO.

For more data circle 338 on Reader Service Card

MACHINE TOOL ADVERTISING AWARDS

Twelve machine tool companies recently received awards in this year's Advertising Competition sponsored by the advertising committee of the National Machine Tool Builders' Association, according to an announcement by Rowell A. McCleneghan, advertising manager of the Barber-Colman Company, Rockford, Illinois, who is general chairman of the Association's advertising committee.

The awards certificates were presented to the winning companies at the Association's Annual Meeting. Fifty-three companies entered a total of 129 exhibits in the competition.

The judges were Fred S. Burnside, mechanical engineer, Farmall Division, International Harvester Co., Rock Island, Illinois; Donald A. Connor, cre-

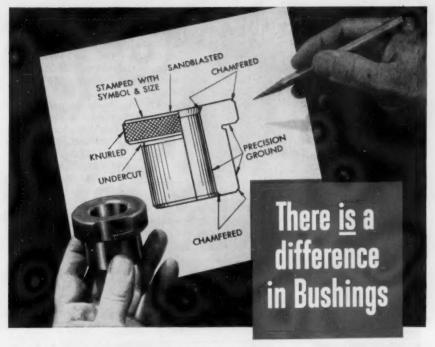
ative department, Lezius Hiles Co., Cleveland, Ohio; W. J. Herrmann, factory manager, Vickers, Inc., Detroit, Michigan; and Robert Kessler, manufacturing manager, Delco-Remy Division, General Motors Corporation, Anderson, Indiana.

The four categories in the contest for which awards were made and the winning companies are as follows:

Category No. 1 An operator's handbook, currently in use, for a machine tool, comprising instructions in machine set-up, operating, adjusting, lubrication. and First: The Warner & Swasey Co., Cleveland, Ohio. Second: The National Acme Co., Cleveland. Ohio.



For more data circle 339 on Reader Service Card



And here's what it means to you!



Recent tests in drilling 16,300 holes show that there is a difference in bushings. In these tests Ex-Cell-O Bushings lasted twice as long as competitive makes.



These differences make Ex-Cell-O a leader: (1) High chrome, high carbon oil-hardening bearing steel, (2) uniform heat treating to 62-64 Rockwell "C". (3) Precision grinding of inside and outside diameters and under the head for perfect seating. (4) Ex-Cell-O's own standards for precision, tougher than A.S.A. standards.



Large inventories in Detroit, Los Angeles, New York, Lima, Ohio and London, Canada, keep your inventory down. You get "same day" shipment. Write for an Ex-Cell-O catalog today.



EX-CELL-O

EX-CELL-O FOR PRECISION



56-59

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND

BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

For more data circle 340 on Reader Service Card

Honorable Mention: Cone Automatic Machine Co., Windsor, Vermont.

Category No. 2—An operators' handbook especially compiled for a machine tool that is not covered by a handbook produced in quantity. First; Lake Erie Engineering Corporation, Buffalo, New York. Second: Micromatic Hone Corporation, Detroit, Michigan. Category No. 3—A repair parts list. First: Abrasive Machine Tool Co., East Providence, Rhode Island. Second: Pratt & Whitney Co., Inc., West Hartford, Connecticut. Honorable Mention: Kearney & Trecker Corp., Milwaukee, Wisconsin.

Category No. 4—A combination handbook which contains a combination of the operating handbook, repair parts list, service manual or any two of them. First: The Cincinnati Milling

Machine Co., Cincinnati, Ohio. Second: (Tied) Giddings & Lewis Machine Tool Co., Fond du Lac, Wisconsin and The R. K. LeBlond Machine Tool Co., Cincinnati, Ohio. Honorable Mention: The Denison Engineering Co., Columbus, Ohio.

WHEREVER SPINDLES ARE NEEDED, STANDARD SUPPLIES THE FINEST! the STANDARD electrical tool co. MAKERS OF 800 DIFFERENT SPINDLES ... AND READY TO DESIGN 1000 MORE FOR INDUSTRY'S NEEDS! WRITE TODAY: SUPER PRECISION SPINDLE DIVISION 2487 RIVER ROAD . CINCINNATI 4, OHIO

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A.M.T.D.A. ELECTS OFFICERS

Joseph Owens, Jr., general manager of the J. F. Owens Machinery Co., Syracuse, N. Y., was elected president of the American Machine Tool Distributors' Association at its 32nd annual meeting held at the Broadmoor Hotel, Colorado Springs, Colorado. Mr. Owens was the Association's vice

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Yes, it's TF/AM*

. . . TIME FOR AN AIR MASTER when "sandpaper-air" drips enough dust on benches and equipment to attract a doodler.

Air borne and collecting dust can reduce equipment to "dirt cheapness." It can injure the health of your employees. Dust can and does cost you money.

If you grind, buff and polish, you need The Cincinnati Air Master . . . for new equipment, and for that already in operation. Closely woven fabric and steel wool filters "wash" aggravating dust and grit laden air. Grinder or buffer switch starts or stops Air Master simultaneously. Compact, quiet operation; easy to clean.

We also manufacture a complete line of Drills, Grinders and Buffers.

For details, write for catalog 56-DA.

The CINCINNATI ELECTRICAL TOOL CO.

304 MT. HOPE AVE. CINCINNATI 4, OHIO



For more data circle 342 on Reader Service Card

president last year. He succeeds Henry R. Hanson, vice president of the Wm. K. Stamets Co., Cleveland, Ohio.

Frank H. Habicht, vice president and general manager of Marshall and Huschart Machinery Co., Chicago, Ill., was elected first vice president of the Association. Mr. Habicht has been the



Joseph F. Owens, Jr. (left) Frank H. Habicht

A.M.T.D.A.'s second vice president during the past year.

Additional officers elected at the meeting are as follows: second vice president, J. O. Ellison, Harron, Rickard and McCone Co. of Northern California, San Francisco, Calif; secretary-treasurer, J. Russell Clark, White Star Machinery and Supply Co., Wichita, Kansas. Members of the executive committee for the terms expiring in 1959 are C. Denson Day, Machinery Associates, Inc., Wynnewood, Pa.; B. C. Greene, Greene Machinery Co., Dallas, Texas; and R. W. Niessen, E. L. Essley Machinery Co., Chicago, Illinois.



S O C K E T S

NOW! HEAT TREATED...

So popular with users.

COLLIS Heat Treated Sleeves and Sockets are manufactured by skilled workmen to give long durable service and extra long life. This type of sleeve has less chance of nicks and assures same accuracy with longer runs.

Call at once for our representative to explain about the Complete Collis Line of Lathe Centers, Arbors, Drill Drifts, and Magic Type Chucks as well as Sleeves and Sockets and Collets.

"Call Collis for Service"

THE COLLIS CO.

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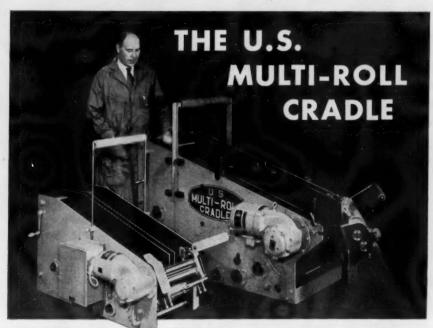
DETROIT BROACH ADDS TO FACILITIES

The Detroit Broach and Machine Company is in the process of building a 15,000 square foot addition to its existing manufacturing plant located in Rochester, Michigan.

It was pointed out that, although the present plant was completed in 1954, the company's present volume in broaching machines and tooling necessitates the additional expansion at this time. Prior to 1954, the company was located on Sherwood Avenue in Detroit.

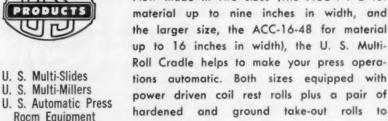
December, 1956

04 modern machine shop



REDUCE





U. S. Die Sets and Accessories

Write for Bulletin 90-S giving complete specifications

of the coil.

U.S. TOOL COMPANY, Inc.

AMPERE (East Orange)

HEW IEBEEV

For more data circle 344 on Reader Service Card

December, 1956

modern machine shop

allow controlled unwinding to the very end

205

news of the industry . . .

CRUCIBLE STEEL ACQUIRES VACUUM METALS CORPORATION

Announcement was recently made that Crucible Steel Company of America, Pittsburgh, Pa., has acquired the entire assets of National Research Corporation in Vacuum Metals Corporation, which now becomes a whollyowned Crucible subsidiary.

Vacuum Metals Corporation was originally organized by National Research in 1946 and, since 1954 when Crucible purchased a 50 per cent interest, has operated as a jointly-owned company. Plant and facilities are located at Syracuse, New York.

James H. Moore will continue as general manager of Vacuum Metals, which will be operated as a Crucible division under the direction of Walter H. Wiewel, Crucible vice president.

JOHN E. POORMAN

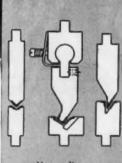
Announcement was made recently of the passing of John E. Poorman. Mr. Poorman was president and founder of J. E. Poorman, Inc., the company which manufactures and distributes R and L Tools.

During his 85 years, Mr. Poorman established a reputation as perfectionist of his trade. The R and L Tools, which he invented, has received worldwide acceptance and acclaim. Mr. Poorman made ample provision for the continuance of the business which he founded. R and L Tools will be headed up by Dora E. Kurtz, who has played a large part in the company's growth since 1929. The manufacturing of R and L Tools will be in the hands of the same men who have been turning out these tools over the years. Operations supervisor will be Norman Barndt, who has been Mr. Poorman's assistant for the past eight years.

INDUCTION HARDENED PRESS BRAKE DIES

for greater die life at no extra cost on any make of press brake

Whether it is a simple die for angle bending or the more complex dies for any of the combined bending and forming operations, Chicago induction-hardened dies offer bonus performance at no extra cost. Field reports on these dies show better than ten times the useful life of the conventional dies used in press brakes. Get the full particulars on Chicago dies for your next press brake job.



Heavy lines indicate hardened surfaces

Steel Bending Brakes for over 50 Years



For more data circle 345 on Reader Service Card

FOSDICK MACHINE TOOL COMPANY PURCHASED BY LEBLOND

Richard E. LeBlond, president of The R. K. LeBlond Machine Tool Co., Norwood, Ohio, has announced that LeBlond has purchased The Fosdick Machine Tool Co., Cincinnati, Ohio. Carl E. Linden, Fosdick's general manager for over 23 years, has been appointed president and general manager of the Fosdick firm. All other Fosdick personnel will be retained. The two firms will continue to do business independently. LeBlond has been building a complete line of lathes for over 70 years; the Fosdick firm manufactures drilling, precision jig boring and grinding equipment. Fosdick employs 200 people; LeBlond, 1,100.

The Fosdick Machine Tool Company, established in 1882, has followed a pattern of steady growth. Since 1941, Fosdick plant facilities have been expanded almost 100 per cent.

Founded in 1887 by the late machine tool pioneer, R. K. LeBlond, The R. K. LeBlond Machine Tool Company was one of the first Cincinnati manufacturing firms to recognize the advantages of suburban plant location. Having occupied several downtown locations, the LeBlond firm in 1898, moved to the Linwood area, where it later outgrew facilities and was established at its present site.



Richard E. LeBlond (left) and Carl E. Linden

CARBIDE

SOLID and TIPPED CUTTING TOOLS

Stock Tools:

Burrs—Carbide
Drills—Solid Carbide
and Tipped
Internal Grindin
Burrs—Solid Carbide
Reamers and End Mills
—Solid Carbide
and Tipped
Slitting Saws—Solid
Carbide
Rotary Files H.S.S.—
Hand cut and
ground from the



Solid

In addition to the foregoing, ESSEX maintains a special tool designing department and can supply the following in Solid Carbide and Carbide-Tipped Tools:

Counterbores
Step-Drills
Twist Drills
Dies
Grooving and Milling
Cutters
Key Cutters

Router Bits
Profiling Cutters, Etc. to
sketch or blueprint
Complete resharpening
and reconditioning serv-

T-Slot Cutters

ice available.

Areas available for distributors
—inquiries invited.



207

Makers of Fine Tools Since 1868

CORPORATION
295 MADISON AVE. • NEW YORK 17, N. Y.

For more data circle 346 on Reader Service Card

modern machine shop



Jerome A. Raterman



Ludlow King



Tell Berna



Alfred V. Bodine

N.M.T.B.A. Elects Officers

Jerome A. Raterman, president, The Monarch Machine Tool Co., Sidney, Ohio, was elected president of the National Machine Tool Builders' Association at its 55th Annual Meeting on November 7th, 8th and 9th at the Edgewater Beach Hotel in Chicago. Ludlow King was elected executive vice president, succeeding Tell Berna.

Alfred V. Bodine, president and treasurer, the Bodine Corp., Bridgeport, Conn., was elected first vice president, and Ralph J. Kraut, president, Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., was elected second vice president and director. Perrin G. March, III, president, The Cincinnati Shaper Co., Cincinnati, Ohio, was elected treasurer, and Walter K. Bailey, president, Warner & Swasey Co., Cleveland, was named secretary.

New directors elected, in addition to Mr. Kraut, were Walter K. Bailey and Edward R. Smith, president and treasurer, Seneca Falls Machine Co., Seneca Falls, New York.



Ralph J. Kraut



Perrin G. March, III



Walter K. Bailey



Edward R. Smith

For better grinding

SIMONDS ABRASIVE CO

Reinforced Resinoid Bonded

ABRASIVE WHEELS



SIMEX®

Save time and money on weld grinding with SIMEX — lightweight, rigid, for heavy duty use. Structurally different, with auto tire cord safety web backing! Send for Bulletin ESA 244.



FIBREX®

ideal for deburring, finishing, polishing and cutting off. Slightly flexible for general offhand use and the lighter world urinding jobs. Extra group and fast cutting. Send for Bulletin ESA-244.



DOUBLE CUT-OFF WHEELS

Glass fiber reinforced for extra strength, less breakage and lang life. Fast cutting on all types of metals and non-metals Send for Bulletin ESA 243





CALL YOUR SIMONDS

LOCAL STOCK

SIMONDS ABRASIVE COMPANY . PHILADELPHIA 37, PA.

Division of Simonds Saw and Stool Co., Fitchburg, Mass.

industry news in brief . . .

W. Robert Kohorst appointed sales engineer, The R. K. LeBlond Machine Tool Company, Cincinnati, Ohio.

Frank T. Goll promoted to sales manager, C. A. Norgren Company, Englewood, Colorado. Jack W. Woodward appointed Southwest manufacturers representative, The Dumore Company, Racine, Wis.

R. E. Price named vice president and assistant general manager, Landis Tool Company, Waynesboro, Pennsylvania.

John J. Sayles has joined the sales engineering staff, W. O. Barnes Company, Inc., Detroit, Michigan. Sil. Do-

> razio has joined the sales engineering staff.



REDUCES OPERATING COSTS . . . INCREASES PRODUCTION EFFICIENCY

In machine tool operations, heat is generated by the separation of the chip from the work by the tool . . . chips transfer heat to the tool which becomes increasingly hot until its cutting edge loses its temper and provides a poor finish. Flood cooling lacks efficiency because the coolant is applied mainly to the chip; therefore, the cutting edge of the tool receives very little, if any, coolant.

The application of Mist cools the cutting edge of the tool, thereby increasing tool life up to 500% and assuring faster and better finishes. MISTIC MIST GENERATORS provide the most economical, efficient and practical mist generating system available.



WRITE TODAY FOR COMPLETE

AETNA MFG. CO.

For more data circle 348 on Reader Service Card

Robert Logie appointed executive vice president, Firth Sterling, Inc., Pittsburgh, Pennsylvania. He has also been elected to board of directors. Anthony J. Snyder named assistant to vice president—sales.

H. R. Leber appointed vice president, Sundstrand Michigan Corporation, subsidiary of Sundstrand Machine Tool Company, Rockford, Illinois.

Irwin F. Holland retired recently from the Pratt and Whitney Company, Inc., West Hartford, Connecticut, at the age of 68. Mr. Holland was with the company for 41 years.

EVER HAVE A MARKING PROBLEM LIKE THIS?

Every day, B engineers accept challenges like this one: designing a machine to mark irregularly shaped parts-clearly, accurately, rapidly, and automatically.

The answer was the (1) unit shown here. It loads for a 30 minute run, automatically turns out accurate-



For more data circle 349 on Reader Service Card

Chicago 13, Illinois

industry news in brief . . .

Joseph L. Kane elected vice president, Kennametal, Inc., Latrobe, Pennsylvania.

Charles W. Wesson named general manager, The Eastern Machine Screw Corporation, New Haven, Connecticut. Frank A. Mitchell named general sales manager, Henry Disston Division, H. K. Porter Company, Inc., Philadelphia, Pennsylvania.

Shadbolt and Boyd Company, 413 North Second Street, Milwaukee, Wisconsin, appointed exclusive Wisconsin distributor, Scientific Lubricants Company, Chicago, Illinois.



Aget offers more! Over 38 standard Dustkop models to choose from . . .

Plus engineering service to help you select, provide, and install the proper accessories and fittings to complete your dust collecting system. Write for illustrated folder . . . Today!

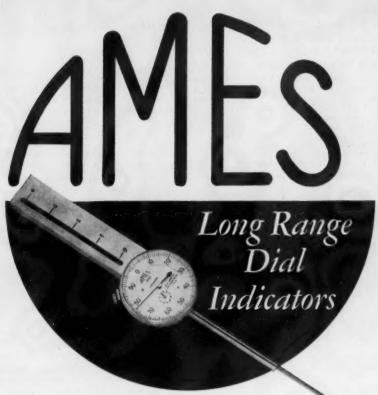
AGET MANUFACTURING COMPANY

For more data circle 350 on Reader Service Card

Kenneth G.
Hunt appointed superintendent of construction and shops, Crucible Steel Company of America, Midland, Pennsylvania. William H.
McBurney appointed supervisor of company's plant protection department.

Samuel P. Caldwell named director of research and development, The Greist Manufacturing Company, New Haven, Connecticut.

Philip O. Geier, Jr., appointed to the new position of assistant manager, Cincinnati Milling Products Division, Cincinnati Milling and Grinding Machines, Inc., Cincinnati. Ohio. Harold W. Cottrell appointed sales manager.



Check Motions or Dimensions In .001" up to 10" Range.

With Ames Long Range Dial Indicator models you can measure in .001", long slide travel, large cams, deep recesses or other dimensions requiring indicator spindle travel of up to 10". Also they have all the advantages built into Ames regular indicators:—large diameter dials, widely spaced dial graduations; movable dials; replaceable contacts, count hands to indicate revolutions of the indicator hand.

Send your problem in long range measuring, Ames will be glad to suggest a solution.

Representatives in principal cities



29 Ames Street, Waltham 54, Mass.

MANUFACTURER OF MICROMETER DIAL GAUGES • MICROMETER DIAL INDICATORS

For more data circle 351 on Reader Service Card

December, 1956

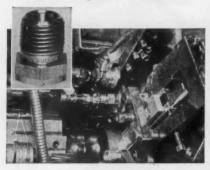
modern machine shop

213

(Advertisement)

OVER 8-MILLION SCREW MACHINE PARTS MARKED AUTOMATICALLY AT TWO CENTS PER THOUSAND

Automatically marking over 8-million parts such as these automotive couplings (inset) with a 21-character impression at a total cost of less than two cents per 1000 parts for complete marking equipment was accomplished by employing a single standard Model 500-C automatic roll marker and die manufactured by New Method Steel Stamps, Inc., 147 Joseph Campau, Detroit. Marking equipment is still in perfect condition.



According to J. B. Cote, President of Berlew Products, Inc., Ferndale, Michigan, total maintenance cost on the several marking operations consisted of 90 cents for a new reset spring during the 4½ years the lone marking unit has operated on the 1½" Acme- Gridley shown tooled for the job. Cote indicated that the cost of marking these products on a secondary operation would have been many times greater due to time and labor costs involved, reduced production output and increased losses from imperfect marking.

The 8-million parts were machined from † hexagonal brass bar stock and were marked with a single roll die which is still in continuous operation. Use of an offset roll die permitted marking within ¼" of the hex head. Versatility of the roll holder permits marking of many different parts with a single unit, using standard interchangeable New Method roll dies.

Marking one part every six seconds, the automatic marking unit turned out the 8,000,000 parts in a period equal to over 4½ years of continuous operation, 8 hours per day and every day of the month.

For more data circle 352 on Reader Service Card

industry news in brief . . .

Size Control Company, 2500 West Washington Boulevard, Chicago 12, Illinois, appointed exclusive warehousing distributor, Alina Corporation. New York, New York.

Vernon L. Loofboro appointed general manager, Gardner Machine Company, Beloit, Wisconsin. Wm. Kissinger named plant manager. John McLaughlin appointed machine shop superintendent and Philip Allen named assistant manager of the abrasive department. John Mourer appointed assistant general manager.

Theodore J. England appointed manager of industrial engineering, Norton Company, Worcester, Massachusetts. Paul L. Lantz named assistant manager of industrial engineering. William F. Watts named factory manager of the refractories division. William P. Densmore appointed chief industrial engineer, refractories division. John H. Indge appointed resident grinding machine demonstrator in New York and Philadelphia areas. John E. Taylor named field engineer at the company's Cleveland district office.

More Information?

For additional information on any product mentioned in this issue, please use the READER SERVICE CARDS opposite pages 32 and 372.



OIL-RELIEF BY-PASS VALVES

IN CONTROL ON

STEAM AND HOT WATER GENERATORS



Just set the pressure—through 6 springs—from 0# to 500# and FULFLO VALVES hold it in a bulldog grip . . . no variation or adjustments. Pipe sizes: $\frac{1}{4}$ " to 2"; standard or flange types.

It's highly important in this Cyclotherm Steam Generator built by U. S. Radiator Corp., Cyclotherm Div., Oswego, N. Y. And just as important built-in or attached to your hydraulic oil systems.

FULFLO VALVES ARE CHATTERLESS—because the cylindrical piston closes off the port in a shearing manner . . . exclusive with FULFLO.

FULFLO ENGINEERS can help you lick most oil-relief problems. Just write. No obligation.

Send today for

NEW MECHANICAL DATA BOOK. Colorfully illustrated with photos, graphs and data.



THE FULFLO SPECIALTIES CO. Inc.
PUMP AND VALVE MANUFACTURERS
BLANCHESTER, OHIO

For more data circle 353 on Reader Service Card



new shop equipment

Descriptions of new machines, tools and materials for metalworking.

HYDRAULIC BENDER IS TOOLED FOR PRODUCING CHAIR PARTS

Product of J. A. Richards Co., Dept. 6-M, Kalamazoo, Mich., the Multiform Model BB-CS "Big Brother" Hydraulic Bender illustrated herewith is equipped with special tooling for the production of tubular chair back supports of various sizes. The unit has an overall size of 4 feet x 11 feet x 4 feet 5 inches; table sizes of 30 x 56 inches;

Mary manage of the state of the

Multiform Model BB-CS "Big Brother" Hydraulic Bender tooled for tubular chair parts

height of 40 inches; shipping weight of 3 tons; standard ram stroke of 4 inches; auxiliary cylinder sweep stroke of 18 inches; and shut distance between heads of 6 and 8 inches (adjustable).

Additional features of the machine include a 15 h.p. totally enclosed operating motor; electronic controls; hydraulic equipment; one-shot lubrication; bending power of 25 tons; automatic cycle of 6 seconds; and inching controls. Built in many smaller models for air, hydraulic and hand operation, the unit can be equipped for bus bar forming, metal fabricating, stamping, blanking, staking, piercing, and other operations.

For more data circle 77 on Reader Service Card



HEAT TREATING FURNACE FEATURES INDUCTION HEATING

An entirely new type of heat treating furnace, named the Induct-O-Ring, has been introduced by Lindberg Engineering Co., 2469 W. Hubbard St., Chicago 12, Ill. This furnace is designed for carbonitriding, bright hardening and carburizing of small parts. It offers two completely new engineering features.

The most interesting development is the use of the induction heating principle. For several years, the manufacturer has used induction heating in its melting furnaces and this experience inspired the development of the Induct-O-Ring. The use of induction heating is claimed to make possible the complete elimination of any heating elements, element terminals, burners, gas or electric connections in the furnace proper.

Another interesting feature is the circular shape of the furnace. This eliminates the usual heat and atmosphere losses occasioned when conventional furnace doors are opened to charge and remove the work load, Material saving in floor space is also accomplished by this novel circular shape.

The company states that a primary advantage of this furnace is its overall high heating efficiency and its spectacular heating rate, hardening temperatures being reached in 17 minutes from cold. All the heat is in the work chamber and work load, held in by a heat-resistant alloy liner deeply embedded in insulation. This affords a more accurate and precise temperature control, as there is practically no temperature override or lag when control point is reached and power goes off and on.

The operation of the furnace is automatic and extremely simple. The circular furnace has a reciprocating motion. It turns slowly in the direction of work travel then quickly reverses. With each action the work remains in the forward position and regularly progresses through the chamber until it reaches a discharge chute. This reciprocating action is quiet and smooth. The furnace moves on sealed ball bearings and each movement ends gently against an air cushion. This motion also is utilized to feed workload into the furnace. Various types of hoppers to fit different types of parts are available.

The circular shape provides a great saving in floor space. By using a double turn on the retort it is possible to have



View of the Lindberg Induct-O-Ring Furnace

30 ft. of furnace length in a 5 foot diameter space. Actually, practically any chamber length within reason can be obtained by increasing the number of turns.

The Induct-O-Ring is a completely self-contained unit. Quench tank, conveyor and quench cooling coils are enclosed in the base of the unit and oil circulator is attached. Control panel is completely wired and only air and power connections are required. The furnace is completely adaptable to automated production processes where its precise heat control, negligible maintenance requirements, and completely dependable operation are of particular importance.

For more data circle 78 on Reader Service Card

AUTOMATIC GEAR GAGING, SORTING AND MACHINE TOOL CONTROL UNIT

A Red Ring Model GRD automatic gear gaging, sorting and machine tool control unit having a compact basic design that features standardized compo-



Red Ring GRD Automatic Gear Gaging Unit

nents which can be adapted to the checking of individual spur or helical gears up to 3 inches in diameter and 3 inches wide is now available from National Broach and Machine Co., 5600 St. Jean Ave., Detroit 13, Mich.

The machine is available in types that will check and sort production gears for both size and helix angle accuracy or size or helix angle only, according to the wants of the user. The machine will shut down gear production machine tools automatically after a specified amount of rejects of a specific type are gaged. Indicator lights tell the type of reject that caused the machine shutdown.

The complete gaging machine consists of a motorized gaging and sorting unit through which the gears are fed one-at-a-time automatically from an inclined feed chute, a stand that supports the gaging unit and reject pans, a separate electrical panel and an individual pushbutton and indicator light control box. The panel and control box can be mounted either near the machine or at some remote location according to the automation and floor space requirements of the user.

For more data circle 79 on Reader Service Card



MILLING AND CENTERING MACHINE IS SMALL AND COMPACT

The Motch and Merryweather Machinery Co., 888 E. 70th St., Cleveland 3, Ohio, has introduced a smaller, more compact transfer machine to double-end mill and center drill. The design employs the in-line transfer principle. Opposed milling heads and drill heads are way-mounted on either side of a fixture table. The operator loads the fixture at the front. The fixture traverses to the milling heads at the rear of the bed. Milling heads advance from each side, mill and return. The table then moves forward to the center drilling station, where two drill heads advance, drill and return. The operator unloads the machined part and reloads the fixture with a new part. The fixture is hydraulically ac-



Illustration showing the Motch and Merryweather Milling and Centering Machine

SHELDON SIGN 13" NEW Sebastian 13" PRECISION LATHE 7



Speed changes easily made by revolving speed dial an headstock



Heavy, multiple Splined Spindle with "Zero Precision" tapered roller bearings



Quick change Gear box provides 60 different threads or feeds — has built-in lead screw reverse



Massive 1-piece, double walled apren with gears running in oil has "1-shot" pressure lubrication system for carriage and ways



Cam action tailstock clamp permits rapid release and instant locking of tailstock



This is a completely new Sebastian Lathe designed and built by Sheldon . . . a rugged work horse with extra power, toolroom accuracy and all the modern features that make for money-saving production . . . with all controls centrally grouped in easy reach for safe efficient operation.

Modern, heavy cast-iron pedestal (included in base price of lathe) completely encloses motor and drive . . . with storage space in tailstock leg for tools and chucks.

Run this new Sebastian lathe. Test its performance. You will appreciate the powerful cuts that this lathe can take. Write for circulars on 13" and 15" Sebastian lathes and name of nearest dealer where you can see and operate these outstanding lathes.

SHELDON MACHINE CO., INC

4250 N. Knox Ave. • Chicago 41, Illinois
For more data circle 354 on Reader Service Card



in our stock bins, ready for immediate shipment

All flutes ground after heat treatment to eliminate freezing of chips.

*All Decimal Reamer diameters are held to plus .0002 and minus .000 for close sizing. Chucking reamers available in 4 sets.

The PRECISE SIZE FOR THE JOB!

No need to order specials and wait? NOW - right from stock ready for immediate delivery . Decimal Chucking or Stub Reamers, Fastcutting, long-lasting 18-4-1 high speed steel. Made for your production economy . . and SMOOTH REAMING.

We take pride in the fact that we perpetually maintain - IN STOCK the largest decimal range of reamers available from any single source in the world!

Our engineering service is always at your disposal.



Just off the press! Complete Reamer Catalog WRITE with the World's Great-FOR est Reamer selection by the thousand's. Territories Available for Rep's.

TWENTIETH CENTURY MANUFACTURING CO.

In Emergency. Phane Libertyville 2-4288

ROUTE 176 and BRADLEY ROAD BOX 429M LIBERTYVILLE, ILL.

For more data circle 355 on Reader Service Card

new shop equipment . . .

tuated for clamping. The cycle is completely automatic after loading of the part through the unclamping of the finished piece.

For more data circle 80 on Reader Service Card

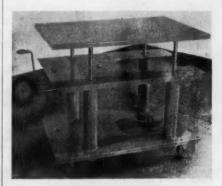


TOOL AND DIE ELEVATING SHOP TRUCK

The Dayton Rogers Manufacturing Co., Minneapolis 7D, Minn., has introduced an improved line of extra heavyduty easy rolling elevating shop trucks, called the Lift-A-Load, with an all weldment steel frame construction and generous size top deck. They feature a two speed elevating mechanism which compensates for both light and heavy load lifting.

Other features include a standard top deck size with high pressure greased ball bearings, casters and easy accessible fittings. Wheels are steel and rubber tired, and can be used for all press feed work and general overall tool and dieroom, as well as general punch press activity.

For more data circle \$1 on Reader Service Card



View of Dayton Rogers Lift-A-Load Shop Truck

MOTCH & MERRYWEATHER
CUT-OFF BLADES
and
SLITTING-SLOTTING SAWS

Triple-

STOCKING DEALERS in all principal cities.

FACTORY-APPROVED SERVICE in many industrial centers.

ENGINEERING SERVICE to solve your specific problem.

Challenge Motch & Merryweather to demonstrate that the Triple-Chip Method will out off stock in faster time, with greater precision, and at lower cost than any other method. Rely upon Motch & Merryweather to engineer your job, recommend the right blade, and follow through. Our wide range of blades and saws is coupled with a wealth of technical experience and data on every phase of the circular saving of all metals. Motch & Merryweather sales engineers in conjunction with dealers nation-wide stand ready to analyze your exact requirements and recommend a complete, profitable solution. Ample, strategically located stocks insure satisfactory delivery.

Also Kroslok Face Milling Cutters and Shell End Mills. Also Triple C Grinding and Cutting Coolants and Machine Cleaner.



THE MOTCH & MERRYWEATHER MACHINERY CO.

- Cutting Tool Manufacturing Division -

1250 EAST 222nd STREET, CLEVELAND 17, OHIO

TRIPLE-CHIP CIRCULAR SEGMENTAL AND SOLID CUT-OFF BLADES - TRIPLE-CHIP SLITTING SAWS - KROSLOK FACE MILLING CUTTERS AND END MILLS - TRIPLE C GRINDING COOLANT - TRIPLE C MACHINE CLEANER - TRIPLE C CUTTING COOLANT

For more data circle 356 on Reader Service Card

PUMP AND TANK UNIT FOR ABRASIVE MATERIALS

The accompanying illustrations shows a newly developed pump and tank unit, designated as the No. 4072-T, for safely handling abrasive materials such as silicon carbide solutions, and so on, on honing, lapping and ul-

trasonic machines. This pump and tank unit is made by The Ruthman Machinery Co., 1817 Reading Road, Cincinnati 2, Ohio.

The reason this unit is capable of handling abrasives is because there are no bearings, seals, packings or dependent close tolerances in contact with the material being pumped. The assembly consists of a 1/10 h.p. Model 1 P3 long Gusher centrifugal pump and a steel tank complete with inlet

and discharge pipe connections and. also, electric cord and plug. The pump is equipped with a motor. having a heavy suspended shaft which rotates on two generous size precision ball bearings within the motor mounted above the tank lid. An even mixture of the liquid is maintained automatically at the internal hemispherical shaped tank bottom.

For more data circle 82 on Reader Service Card

Drill Hardened Steelswithout Annealing –



With the new, improved "HARDSTEEL" Drill, you can do accurate, smooth drilling, countersinking, counterboring and reaming in steels hardened by any process without first annealing the work. And they work with equal ease on work-hardening steels and high carbon high chrome steels of any degree of hardness.

"HARDSTEEL" Drills fit standard drill presses. They save time and reduce rejects. They permit engineering changes requiring additional drilling after hardening. And parts drilled after hardening always match at assembly.

Write for a copy of the "HARDSTEEL" Operators Manual showing how "HARDSTEEL" drills are cutting costs in thousands of plants.

You Harden It—We'll Drill It— With "HARDSTEEL"

BLACK DRILL COMPANY, INC. 1372 East 222nd St. • Cleveland 17, Ohio



"HARDSTEEL"

For more data circle 357 on Reader Service Card



Ruthman Pump and Tank Unit, 4072-T

TENTHS ACCURACY ON ANY COMPLEX CONTOUR



Instead of single template bars, Model 83 uses a pair of enlarged synchronized templates to obtain complex contours never possible before. It will dress any angle on the grinding wheel, perpendicular as well as horizontal. If the diamond can enter into the profile, the profile can be dressed. Here is perfect contour grinding accuracy through correct dressing of abrasive wheels practically eliminating the need for skilled operators.

Write for folder.

HOGLUND ENGINEERING & MANUFACTURING CO., INC.

341 SNYDER AVE., BERKELEY HEIGHTS, NEW JERSEY

For more data circle 358 on Reader Service Card

DIAL INDICATOR WITH ACCURACY TO 10 MILLIONTHS

Petz-Emery Inc., Pleasant Valley, N. Y., has added to its existing line of 24 models a newly-designed dial indicator, designated as the Model 21019. that is claimed to give accurate read-

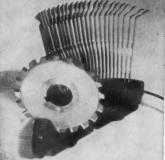
ings to within 10 millionths (0.00001 inch). It is graduated in 50 millionths (0.00005 inch) over a measuring range of 0.002 inch. Bezel size is 21/4 inches. This indicator was developed to satisfy industry's increasing need for closer tolerances and closer adherence to those tolerances.

According to the manufacturer, the precision action of the indicator results from extremely simple construction and fully jeweled movements, protected by

the exclusive Emre 100 per cent shockproof system. Thus, the jewels cannot be damaged and the entire internal mechanism is virtually indestructible. Extensive testing under the severest conditions has failed to impair the indicator's ability to maintain its accuracy. It is manufactured to A.G.D. Group 2 mounting specifications.

Non-glare bezels are available in





Slotting typewriter type bar seament.

"THINSAW"

Solve problems in high-precision slitting, slotting, sawing with Gay-Lee carbide-tipped Thinsaw! Wafer-thin for the most delicate work with positive alignment and rigidity that avoid run-out ... but retaining the speed and long life of carbide. Patented construction holds tips firmly.



- THIN AS .030"
- DIAMETERS UP TO 12"

Complete Line of Saws for Any Application—To Any Tolerance

WRITE FOR FULL INFORMATION



For more data circle 359 on Reader Service Card



View of Em-re Model 21019 Dial Indicator

NEW Grip-lip CENTERS (Patented) CHECK · Long-Life Holders Replaceable Carbide Tips o Easy Insertion and Removal of Male or Female Tips Reduced Machine Down-Time Lower Cost for Replacement of Carbide Tips Carbide Tips Accurate to .0003 No Regrinding of Holder Carbide Tips Are Easy and with. Inexpensive to Stock • Reduced Regrinding Time

Grip-Tip Centers are specifically designed to substantially reduce your replacement costs and machine down-time for regrinding or replacement of worn or chipped centers.

Longer Diamond Wheel Life

Male or female carbide tips are inserted or removed from the tool steel holders by simply turning a screw. The unique clamping action of holders on tips is positive and quick . . . you save replacement time with Grip-Tip Centers.

The life of Grip-Tip holders is practically unlimited, for, only the dull or chipped carbide tips are

reground. Because the steel holder is not ground when sharpening the carbide tip there is less clogging and longer life for your diamond wheels. Also, the relatively inexpensive double end tips in both male and female types can be stocked with a minimum investment . . . Grip-Tip Centers reduce tool and inventory costs.

REPLACEABLE

CARBIDE TIPS

Grip-Tip Centers increase your production by permitting full utilization of machine tools, It takes but a minute to remove old carbide tip and replace with a new one . . . machine down-time is less with Grip-Tip Centers.

For Further Information, Write to:

DETROIT REAMER & TOOL CO

780 W. MAPLE RD. . P.O. BOX 174 . BIRMINGHAM, MICH.



For more data circle 360 on Reader Service Card



NEW ALBANY MACHINE MFG. CO. NEW ALBANY, INDIANA For more data circle 361 on Reader Service Card

new shop equipment . . .

black or other colors. Decimal graduations in black are on glare-free aluminum white dials. The Em-re dial indicator is anti-magnetic.

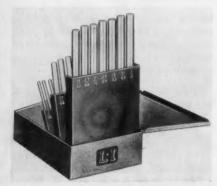
For more data circle 83 on Reader Service Card

* * *

HIGH PRECISION DRILL AND REAMER BLANKS Lavellee and Ide, Inc., Chicopee,

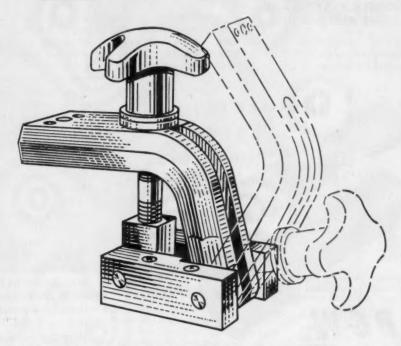
Mass., recently introduced its new line of high precision drill and reamer blanks. These new items to the L & I line are available from stock in fractional sizes 1/16 inch through 1 inch. wire gage sizes No. 1 through 80, letter sizes A through Z and in complete sets. In addition to the wide size ranges offered, both drill and reamer blanks are of the highest tolerances, requiring less machining and finishing time. Drill blanks up to 1/2 inch plus 0.0000 inch, minus 0.0003 inch, over 1/2 inch plus 0.0000 inch, minus 0.0005 inch. Reamer blanks up to ½ inch plus 0.0002 inch, minus 0.0000, over 1/2 inch plus 0.0005 inch. minus 0.0000 inch.

For more data circle 84 on Reader Service Card



L & I High Precision Drill and Reamer Blanks

The New Lodding Self-Retracting Clamp



Positive clamping . . . time saving . . . fastest and strongest. No need to pull clamp strap away; it comes back by itself. Alloy steel forging. Lodding Retracting Clamps are made in four sizes, four styles-hand knob, hand cam, nut and air operated.

LODDING, INC.

WORCESTER 1, MASSACHUSETTS

Factory Warehouses

Precision Tool Sales 417 E. Florence Ave., Los Angeles 3, Calif. 1047 Forest Ave., Evanston, Ill.

Bagby Engineering Co.

For more data circle 362 on Reader Service Card

SUPER-COMPACT ELECTRO MAGNETIC PLATE CLAMP IS LIGHT AND PORTABLE

A new model of the portable electro magnetic plate clamp for positioning and holding work for welding has been announced by Buck Manufacturing Co., 100 Roberts Rd., Los Gatos, Calif. The unit, called the PC-6, weighs only 78 lb. and stands just 10 inches high. The super-compact unit has been made possible due to a reduced rectifier element, which has permitted cutting the housing unit nearly in half. Performance features include direct lift off up to 6,500 lb.

> and a reverse polarity switch for quick release of magnetic pull.

The lighter weight provides greater portability, and the reduced size means easy access to tough - to - get - to positions. The unit is claimed to eliminate all clips. wedges, dogs and bags. According to the manufacturer. there is no deburring or burning after the welding job is finished.

For more data circle 85 on Reader Service Card



HOLDERS Quick-Change

for Form Relief FLAT STEP DRILLS and REAMERS

The Center Lock provides instant and uniform interchangeability — no new set-up required. Use for I.D. tooling on non-ferrous metals for maximum production—minimum down-time.

Send us your blueprints for prompt quotations

B&W PRECISION PRODUCTS CO.

11393 E. Eight Mile Rd., P.O. Box 3865, Detroit 5, Mich.

For more data circle 363 on Reader Service Card



Buck PC-6 Electro **Magnetic Plate Clamp**



10" Precision TOOLROOM LATHE

Sound design, expert workmanship and quality materials give the 10° South Bend Lathe the dependable performance you want. Equipped with a precision lead screw, thread dial indicator and thread cutting stop, you can use it with confidence for cutting screw threads, making precision gauges or turning out instrument parts.

Another outstanding feature is the 1'' collet capacity and $1\frac{3}{8}''$ spindle bore which is built on the same design and specifications of larger lathes. The large spindle bore gives you big lathe collet capacity in a small, compact unit.

10" Toolroom Lathe, illustrated, less motor and controls. Time payment terms available.

\$1628.00 f.o.b. Factory

SPECIFICATIONS

SPINDLE SPEEDS (12) 50 to 1357 r.p.m., approximately.

THREAD CUTTING 70 R.H. or L.H. pitches, 4 to 480 per inch.



PLEASE SEN	. INFORMAT		CKEDI			-
		· 4		門門		The state of the s
9' and 10'	PLOOR LATHES	DRILL PRESSES	W'4 1" Colle	TOOL ORINDE	RS 7" BENCH	MACHINE
Name	-		Street			
City			State			

Building Better Tools Since 1906 + SOUTH BEND LATHE . South Band 22, Indiana

For more data circle 364 on Reader Service Card

MICROMETER FEATURES INTERCHANGEABLE ANVILS

Because of its universal features, the No. 220 "Mul-T-Anvil" Micrometer, recently introduced by The L. S. Starrett Co., Athol, Mass., is claimed to handle a wide variety of measurements impossible to obtain with regular mi-



Starrett No. 220 "Mul-T-Anvil" Micrometer

crometers. A brand new development in micrometer design, it features mul-

tiple interchangeable anvils.

Two anvils are furnished: a rod anvil approximately 0.120 inch in diameter and a flat anvil 0.125 and 0.060 inch thick at opposite ends. The rod anvil is useful for measuring from a hole to an edge. With the flat anvil. distances from the inside of slots and grooves to an edge can be conveniently measured. Additional anvils of various shapes can be made up by anyone and do not necessarily have to be hardened for occasional special jobs.

This micrometer features a visetype frame, which holds the interchangeable anvils. Changeover of anvils for different measuring jobs is quick and easy—





Pivoting Head Design Permits L.H. and R.H. Operation

♠ This new, small, compact Pines Bender for production, experimental, or small lot bending work is actually two machines in one. It's designed with a pivoting head and top assembly and double ways which permit fast, efficient handling of bending operation in either clockwise or counter-clockwise direction. Changeovers can be made in two minutes. You save time and reduce work handling where multiple planes and odd workpiece shapes cause interference on ordinary machines. These exclusive features permit double tooling setups, fast, accurate bending results.

300 - 400 Bends Per Hour

Typical production rates average 300 – 400 bends per hour, and the machine is powered to handle work up to 1" O.D., 16-gauge (.062") steel tubes, \(\frac{1}{2}\) bar stock, or equivalent in continuous production. Economical tooling features make it an ideal unit for tool room or experimental department work as well as for medium production.

- DEPENDABLE HYDRAULIC OPER-ATION—complete self-contained system.
- HIGHLY VERSATILE—will bend tubing, bars, angles, channels, extrusions.
- ECONOMICAL TOOLING interchangeable for both R.H. and L.H. bends.
- COMPACT, RUGGED—occupies 3'6" x
 8' floor space. Cast steel nose, heavyduty bearings.
- EASY OPERATION simple toggle clamping, convenient controls.



PRODUCTION BENDING . DEBURRING . CHAMPERING MACHINERY



Write for complete data on this new Pines 2-in-1 machine or ask for a Pines sales engineer who will assist you with any bending problem.

For more data circle 366 on Reader Service Card

the desired anvil is placed in the frame vise and, after tightening the locking screw, the micrometer is ready for use. The micrometer can also be used as a height gage by simply removing the clamping vise jaw.

The "Mul-T-Anvil" Micrometer is available in two sizes with ranges of 0 to 1 inch and 1 to 2 inches in thou-

sandths of an inch. It also features balanced design, non-glare satin chrome finish, hardened and ground spindle.

For more data circle 86 on Reader Service Card

MULTI-PURPOSE METALWORKING MACHINE

The "Little Blacksmith" 55, recently announced by the J. F. Kidder Manu-

facturing Co., Inc., Dept. PR-3, 426 Colchester Ave., Burlington, Vt., is an economical piece of metalworking equipment that does a wide variety of work. The manufacturer offers attachments for notching, punching, bending and

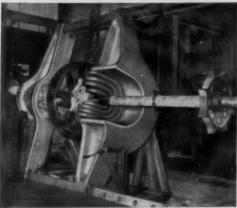


Threading Bits
For more data circle 367 on Reader Service Card



View of Kidder "Little Blacksmith" 55

A MOUNTAIN & POWER



POWER FOR BIG JOBS — Here a Rodgers 600-Ton Inclined Forcing Press is forcing a large gear and sprocket from a mine morthing shaft.

or a touch of pressure

The heavy machines and equipment used in the great iron mining industry present a variety of problems when repair or maintenance is necessary. For this work the accurately controlled action of Rodgers Hydraulic Forcing Presses is a real time and work saver.

real time and work saver.

A Rodgers Forcing Press puts a mountain of power at your fingertips to force wheels, sprockets or gears from their shafts and for straightening, assembling, swedging or upsetting jobs. Operators also use the versatility, speed, power and positive control of a Rodgers Forcing Press to efficiently perform small pressing and forcing jobs with just a touch of pressure—tasks once done only on vertical shop presses!

you get both with RODGERS FORCING PRESSES

Rodgers vertical, horizontal and inclined forcing presses offer capacities from 100 to 600 tons . . . up to 9 feet between tension bars . . . up to 16 feet between ram and abutment . . . single or double acting cylinders with 13 or 26-inch ram travel (72-inch travel available) . . . electrically powered hydraulic pumps with selective, positive pressure adjustment and remote control . . . removable press cylinders that

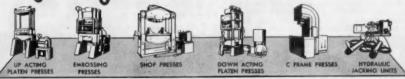
can be used in special jacking or pulling jobs...and many more features that assure you of dependable, long life operation — all fully described in Rodgers Catalog Number 315A.

Write for it today!



LIGHT TOUCH FOR SMALL JOBS—This Rodgers 300-Ton Inclined Forcing Press is used on small as well as large equipment repairs. Here, a pin is being pressed out of a tractor idler support bracket.

Rodgers Hydraulic Inc. 7447 Walker St., Minneapolis 26, Minn.



For more data circle 368 on Reader Service Card

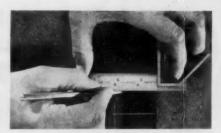
straight and angle shearing. The depth of throat is $6\frac{1}{2}$ inches. Weight with the stand is 330 lb. Floor space is 14 by 24 inches.

For more data circle 87 on Reader Service Card



LIGHTWEIGHT MARKING

Designed for faster die layout, scoring, etching, engraving and marking in toolrooms, machine tool repair shops, industrial plants, sheet metal shops and so on, as well as indicating service dates on production equipment and business machines, a lightweight tool, named the Micro-Scriber, has been introduced by The Greist Manufacturing Co., 495 Blake St., New Haven 15,



View showing Greist Micro-Scriber in use

Conn. It can be utilized to scribe or etch all metals including hardened steel, aluminum, corrugated sheet, brass, bronze, monel and precious gems, glass, ceramics, plastics and so on. It has a solid carbide tip which is diamond ground and precision lapped. This carbide tip is secured within the tool and is mounted in a polished aluminum handle, hexagonal in shape so that it will not roll.

For more data circle 88 on Reader Service Card

People work better when they SEE BETTER®

At PRATT & WHITNEY AIRCRAFT

the MAGNI-FOCUSER belps insure accurate inspection of a precision part for an aircraft engine.



MAGNI-FOCUSER'S

matched prismatic lenses give needle-sharp magnification. Comfortably light weight. Fits over regular glasses. Leaves both hands free. Normal vision may be resumed by lifting head.

MAGNI-FOCUSER

SPEEDS PRODUCTION With Third Dimensional (3-D) Vision Leaves both hands free to work

Magni-Focuser—the binocular magnifier—reduces eye-strain and prevents squinting—thereby speeding production, increasing accuracy and minimizing the chance of errors and accidents.

Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Restores the usefulness of the skilled hands of many older workers whose vision needs a seeing aid.

Magni-Focuser can help your plant produce better. Immediate delivery. 10-day trial without obligation. Return to us if not satisfied. \$10.50.

Send for descriptive folder

EDROY PRODUCTS CO. 480 Lexington Ave., Dept. P. New York 17, N. Y.

For more data circle 369 on Reader Service Card

NEW EXCEL No. 7A 6x12 SURFACE GRINDER

Big machine features
... yours at LOW COST

- Elevating Handwheel located below table level. Operator can simultaneously see floating vernier dial pointer and grinding wheel as it contacts the work.
 No reaching over head.
- Hard Chrome Table Ways insure long lived accuracy, do not have to be rescraped periodically.
- Precision Thread Ground Lead Screws are made from a special long-wearing lead screw steel.
- Smooth Timing Belt Drive contributes to smoother grinding finishes. No rack and pinion. No lubrication needed.

Ideal for tool room work, rugged enough for many production jobs, you'll find the No. 7A a profitable investment even if you use it only part-time. Write or phone for full details.



OVEL PRECISION

BENTON HARBOR, MICH., DEPT. M-126

HYDRAULIC & HAND FEED SURFACE GRINDERS . UNIVERSAL CUTTER & TOOL GRINDERS . DRILL GRINDER.

For more data circle 370 on Reader Service Card

HYDRAULIC MARKING MACHINE

The Parker Stamp Works, Hartford, Conn., has announced its No. 710 Hydraulic Marking Machine. Smaller than normal hydraulic marking machines, it stands on an 18 by 20 inch space, yet is said to mark everything much larger machines are designed to handle. The machine performs normal marking operations requiring up to 8,000 pounds pressure with a maximum lettering length of 3½ inches. It will stamp up to four lines of 1/16 inch characters. This compact, well-designed unit is built with a heavy die slide which operates on roller bearings. Simplified controls, recessed switch well with indicator light; quick and simple adjustment of table and die slide stroke

are claimed to make this an ideal machine for general marking operations. The No. 710 will accept flats up to 5 inches thick and rounds up to 5 inches in diameter. It has a handwheel adjustment that will move the table 4 inches up or down. A single convenient con-



Swivel and Air Counterbalance attachment makes it possible to adapt large multiple spindle drill and tapping heads to radial

drilling machines. Flexible and easily adjusted, it insures maximum safety for the operator, as

well as better operating economy.

Attachment includes air filter, pressure regulator, and an air oiler, and incorporates a 360° swivel feature fully aligning the drill head. It operates equally well with the fixed center type head and the adjustable type head.

This package is ideally suited for drilling condenser plates, boiler tube sheets, flue sheets, etc.



Parker 710 Hydraulic Marking Machine

Manufacturers of all types of Fixed Center, Adjustable, and Individual Lead Screw Tapping Heads



BURHS STREET . CINCINNATI 4, ONIO

For more data circle 371 on Reader Service Card

MULTIPLE SPINDLES ...

Illustration shows Twin Spindle Gorton Duplicator profiling 15 blades on two impeller rings of stainless steel alloy from a single blade master.

LE TIME; CUT COSTS!



Multiple Milling Heads Multiply Output!

Gorton Twin Spindle Duplicators - manually controlled (shown above) or up to 6 Spindles hydraulically controlled, boost individual machine productivity.

A wide range of spindle speeds—up to 12,000 R.P.M. . . for either high speed steel or carbide cutters. Gorton Super-Speed Vertical Mills and Duplicators are ideal for vertical milling, inside or outside profiling, die sinking, mold cutting, counterboring, chamfer-

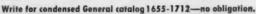
ing, grooving and for general duplicating in ferrous and non-ferrous metals as well as plastics. Work pieces may be flat, cylindrical, spherical, square, uniformly curved or irregular in shape. Standard models or custom designed — Gorton Tracer controlled Duplicators fill many present day needs for more production at lower costs.

SPINDLE SPEEDS UP TO 12,000 R.P.M.

- · 10 Models Super-Speed Vertical Mills
- 7 Models quickly convertible for Duplicating or Milling.
- · Horsepower from 1/2 to 15.

Gorton offers to supervisors and department heads a full-color and sound 16mm film 'Tracer Control in Action", showing Multiple Spindle Milling applications. Write for complete information.







GEORGE GORTON MACHINE CO.

1712 RACINE STREET . RACINE, WIS.

1893

Tracer-Controlled Pantographs, Duplicators—standard and special...Horizontal and Vertical Mills, Swiss-Type Screw Machines, Tool Grinders, Small Tools and Accessories.

For more data circle 372 on Reader Service Card

December, 1956

modern machine shop

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trol knob quickly adjusts the pressure. The machine is sturdily built on a one piece frame. Production capacity is 800 to 1,000 parts per hour.

For more data circle 89 on Reader Service Card



LIGHTING UNIT WITH HEAT VENTILATED REFLECTOR

The Model 55-VCX-701 Localite, product of Fostoria Pressed Steel Corp., Fostoria, Ohio, has a uniquely designed reflector, which automatically ventilates the lamp heat to keep the reflector cool. An inner reflector shield accessory is also available for extreme coolness when using 100 watt lamps. Localites are designed with instantly adjustable frictional arm and collar

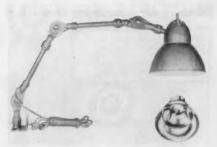


Illustration showing Fostoria Localite equipped with automatic heat ventilated reflector

disc joints, which provide the flexibility of a thousand positions to direct light as wanted on machine tool, assembly and inspection operations. They are equipped with a heavy-duty industrial socket Levolier switch, SPT-2 18/2 heavy-duty plastic rip cord wiring with molded plug and universal base for machine or bench mounting.

For more data circle 90 on Reader Service Card

Cuts Tubing to Accurate Lengths in SPLIT SECOND TIME!

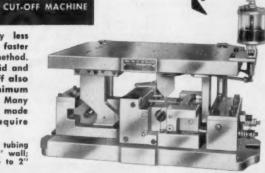
VOGEL TUBE

LENGTHS of ½ inch or more are accurately cut to ± .010" with each

than Vs of a second or faster han any other known method. In addition to being rapid and precise, the Vogel Cut-Off also cuts clean with a minimum of burr and distortion. Many thousands of cuts can be made before shear blades require sharpening.

Unit No. 12 accommodates tubing up to $\frac{1}{2}$ " O.D. with $\frac{3}{32}$ " wall; the No. 2 takes tubing up to $\frac{2}{3}$ " O.D. with $\frac{1}{6}$ " wall.

Ask for sample showing how clean-cut your tubing can be sheared with this machine.



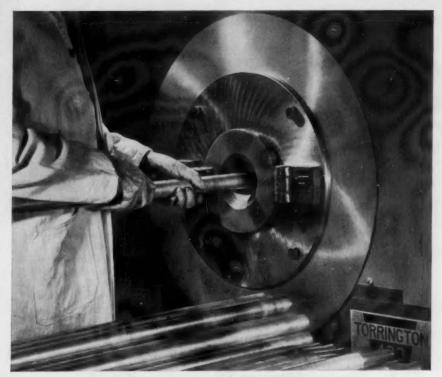
PATENTED

VOGEL

TOOL AND DIE CORPORATION 1823 NORTH 32nd AVENUE, MELROSE PARK, ILLINOIS

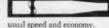
For more data circle 373 on Reader Service Card

...............



ROTARY SWAGING

is fast and economical



A wide variety of work can be performed by Torrington Rotary Swaging Machines – with un-

The swaging time to shape this section of 1%" tubing is only 6% seconds. And the operation is easily and accurately performed by unskilled labor.

It your operations include reducing, tapering, pointing, sizing, bonding, forming inside contours or threads—rotary swaging offers many advantages over other methods.

Write today for our informative booklet on Torrington Rotary Swaging Machines. Or even better, ask to have a technical representative call to show you where rotary swaging can achieve new savings in your plant.

THE TORRINGTON COMPANY
Swaging Machine Division
730 North Street, Torrington, Conn.



- 1 Savings in material—swaging is chip less—shapes the work instead of cutting metal away.
- 2 Saving in labor swaging can be done by unskilled labor.
- 3 Improved products swaging improves grain structure, tensile strength, resiliency and finish. Produces work accurate to ± .001" and better.



Terrington Job-Tested Swaging Dies—for the best in swaging machine dies—at economical prices, contact Torrington. All Torrington dies are job-tested before shipment.



TORRINGTON SWAGING MACHINES

Makers of Torrington Needle Bearings
For more data circle 374 on Reader Service Card

December, 1956

modern machine shop

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BRASS SLAB MILLING CUTTERS IMPROVE FINISH AND **CUT COSTS**

Development of brass slab milling cutters has been announced by Goddard and Goddard Co., Detroit 23, Mich. The cutters contain six rows of "one-position" blades in a special con-



View of Goddard Brass Slab Milling Cutter

struction wherein standard spiral-faced flat high speed steel blades are wedged in straight body slots. This is said to permit uniform absorption of wedge pressures, minimize strain and blade breakage. Heavy peripheral cuts are

> possible since cutting edge is on a helix. Grinding is simplified by incorporating a grinding guide slot in the cutter body.

According to the manufacturer, long life results from the utilization of a coarser pitch that eliminates heatimportant in machining soft metal alloys - and provides the advantage of blade economy and considerable reduced cutter maintenance costs. Accuracy in manufacture eliminates customer work on the blades (facing recut service) other than to clear the periphery. They can be assembled in any position in the bodies and are claimed to maintain alignment.

For more data circle 91 on Reader Service Card



DICKERMAN MFG. CO.

Springfield, Mass.

324-222 Albany Street

For more data circle 375 on Reader Service Card

...ask BARD about it



Find out why this BAIRD Model H is the best Tumbling Machine for many installations

Tumbling operations have become one of industry's most effective low-cost production methods . . . with wide-open opportunities for increasing application.

The Baird Model H machine . . . entirely new in design . . . has been developed with these important expanding applications in mind. It is essentially a production-line machine . . . built to pay out in freedom from maintenance, long service life, and operating ease when installed for constant-duty service.

It is "clean limbed" and efficient, with "finger-tip," effort-saving controls for either manual-hydraulic or power tilting. All types of barrels may be accommodated, and Baird furnishes a complete selection, including electrically heated types.

If your requirements call for tumbling machines capable of constant, dependable production-line operation at minimum cost per service hour, this NEW BAIRD MODEL H will be your best selection. Our experience is yours to call upon . . . "Ask BAIRD about it." Write Dept. MM.

AUTOMATIC MACHINE TOOLS . AUTOMATIC WIRE & RIBBON METAL FORMING MACHINES . AUTOMATIC PRESSES . TUMBLING BARRELS

THE BAIRD MACHINE COMPANY
STRATFORD CONNECTICUT

48A56

For more data circle 376 on Reader Service Card

December, 1956

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FULL SERIES OF DOUBLE UNIVERSAL JOINTS FOR SLOW SPEED APPLICATIONS

A complete series of double universal joints is now available from Lovejoy Flexible Coupling Co., Dept. MSC, 4800 W. Lake St., Chicago 44, Ill., for slow speed applications up to 300 r.p.m. Thirteen standard sizes provide a



View showing Lovejoy Double Universal Joint

horsepower range from $\frac{1}{2}$ to 207 at 100 r.p.m., static torque from 340 to 130, 700 in.-lb. Maximum operating angle of the joint is 90 degrees.

Look into the complete, cost-cutting LOVEJOY line. Standard tools are in stock - to help you increase production, save time and money now!



INSERTED-TOOTH MILLING CUTTERS

Face, side, end, slotting and boring mills.

H. S. S., CARBIDE, **ALLOY BLADES**

Interchangeable in all Type "A" milling cutters from 41/2" to 24" in diameter.

NEW! SET-SCREW TYPE END MILLS

And new Type "Z" slotting cutters provide maximum axial and radial adjustment.

Boring Tools · Arbors · Flywheels Lovejoy Milling Cutter - Assembly Gage

Special cutters are a Lovejoy specialty Write for new catalogs: No. 31 (Face Mills), No. 32 (Side Mills), No. 33 (Arbors).

130 MAIN ST., SPRINGFIELD, VERMONT

Send for free SPEED & FEED CALCULATOR

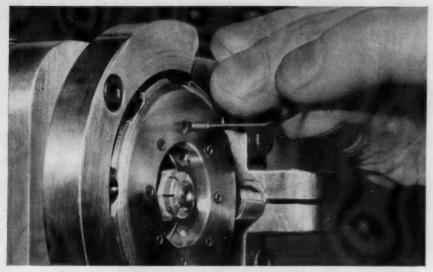
TOOL COMPAN SPRINGFIELD, VERMONT, U.

For more data circle 377 on Reader Service Card

Joints can be supplied solid or bored, with hub diameters from 1/2 to 4 inches. Standard lengths run from 4 to 211/4 inches. However. since many applications require widely varying lengths, all sizes can be furnished to meet any specifications.

Forks are precision ground from high quality alloy steel and are concentric to 0.001 inch. Pins are oilhardened drill rods for maxiwearing mum qualities. They are ground to 0.0005 inch tolerances. Center blocks, likewise ground to close tolerances, are made from hardened alloy steel. Holes are closely controlled to assure accurate intersection.

For more data circle 92 on Reader Service Card



Microsize UNBRAKO socket screws simplify design problems—even in highly specialized equipment like this prototype precision loading device for use in advanced automated production operations.

Miniaturize with UNBRAKO set screws



You need not design special set screws to secure your new miniaturized equipment. Microsize Unbrakos were developed specifically for use in modern small devices.

UNBRAKO screws are made of carefully selected alloy steel. They are manufactured to timepiece precision. Sockets are deep and uniform for greatest wrench engagement and longest reuse. Threads are fully formed for maximum strength and exact fit. And UNBRAKOS are heat treated to the optimum condition for high tensile strength and ductility without brittleness or decarburization.

Ask your authorized industrial distributor about microsize Unbrako socket screws today. Or write us for Bulletin 2055 and samples. Unbrako Socket Screw Division, STANDARD PRESSED STEEL Co., Jenkintown 22, Pa.

STANDARD PRESSED STEEL CO.



D SOCKET SCREW DIVISION

SPS

ENKINTOWN PENNSYLVANIA

For more data circle 378 on Reader Service Card

December, 1956

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SPECIAL FIXED CENTER MILLING HEAD

The accompanying illustration shows a large fixed center milling head built for a special application by Thriftmaster Products Corp., 1034A North Plum St., Lancaster, Pa. This especially de-

signed head mounts on the overarm of a milling machine and is supported against the machine column. Special short type milling machine spindles, containing standard No. 50 taper, were incorporated for using form cutters in steel plate. These special milling spindles are also claimed to eliminate overhang and provide more rigid mounting of tools.

This special milling head has full

ball bearing construction on all rotating parts. Gears are wide faced helical type cut from Chrome-Moly steel and fully heat-treated and hardened to provide maximum strength and assure long operating life without appreciable wear. Spindles are similarly made from Chrome - Molv steel. A circulating oil pump is said to provide complete oil lubrication to all bearings and gears of the milling head. For more data circle 93 on Reader Service Card



storage wall units make economical storage space

Use these sturdy units individually or stack them to form storage walls or partitions. Built of prime coldrolled steel, all welded, finished in standard green baked-on enamel, units are 33 \(\frac{3}{4} \) in. wide by 11 \(\frac{1}{4} \) in. high, either 11 or 17 in. deep. Available with 12, 16, 18, 24 or 32 interchangeable drawers of 3 different sizes. Standard sizes are stocked by your industrial distributor. See him for details. Or write Hallowell Shop Equipment Division, STANDARD PRESSED STEEL Co., Jenkintown 22, Pa.

STANDARD PRESSED STEEL CO.

HALLOWELL SHOP EQUIPMENT DIVISION

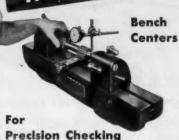


Thriftmaster Special Fixed Milling Head

For more data circle 379 on Reader Service Card

Time Saving Production and Checking Accessories

Here are three Sundstrand accessories that may prove helpful in your work. A wide range of bench centers and balancing tools are available for checking purposes. The automatic index base has proved a sound addition to many metal working machines. Write for further information.



Simplify assembly, lower spoilage and get better production from this modern Sundstrand Bench Center. You'll check work between centers easier, faster and within limits of .0001" on this improved Sundstrand Bench Center.

COMPLETE RANGE AS FOLLOWS:

6" x 18" 12" x 48" 24" x 48" 6" x 36" 12" x 60" 24" x 60" 12" x 36" 12" x 72" 24" x 72"

Balancing Tools For Small



Medium or Large Work

Sundstrand offers a complete line of balancing tools which will save their cost quickly on truing or balancing operations. Accurately sensitive and durable, they provide a simple, reliable means

for checking the balance of parts like gears shafts, fly wheels, pulleys, etc. Standard swing sizes range from 21 inches up to any swing desired. Length between standards ranges from 20 inches to any length desired.

Automatic Index Base For More Production



This automatic index base is designed so there is no strain against the index plunger during the cut. The base is locked by powerful clamping so that accuracy of index is not affected by heavy cuts.

In many cases, the addition of this Automatic index base has increased milling production enough to eliminate need for the purchase of additional machinery. It may be the answer to your milling production requirements. Call in a Sundstrand engineer. There is no obligation for this.

Free Data

Complete specifications are available on these three time saving accessories. Write for your copies today. Ask for bulletin 575.





SUNDSTRAND MACHINE TOOL CO.

For more data circle 380 on Reader Service Card

ELECTRONIC GAGE UNITS

A high-speed electronic gage team consisting of a small electronic pickup cartridge—Electrojet—for incorporating in new and existing gages and precision instruments, and a portable electronic amplifier — Accutron — is now



Fits any machine base. Load capacity 100,000 lbs. 360° directional control. No skids, cable or pipe needed. Safer, faster. Ask for literature and names of current users for proof.

MIGHTY MOVER CO.

1701 East Louisiana Denver 10, Colo.

For more data circle 381 on Reader Service Card



"Electrojet" Electronic Gage Cartridge

available from the Sheffield Corp., Dayton 1, Ohio. Each unit has a number of new and outstanding gage features. The Electrojet is small, compact and easily mounted. It requires no pickup calibration, being set by locating in setting fixture only. It can be used with the full range of Accutron amplifications from 1,000 to 1 up to 40,000 to 1. The Accutron amplifier has dual amplifications that can be switched from one to another without requiring realignment of the indicating meter mechanism.

The Electrojet is a transducer type gage cartridge $\frac{3}{8}$ inch in diameter by $\frac{1}{8}$ inches long. This size makes it

Now Available in . . . "SPRAY ON" CANS

crown design I

Order it the way you use it — In handy 12-oz. Aerosol spray cans, or by the pint, quart, gallon or barrel in bulk! Crown ink dries to an excellent scribing texture in a minute! Ideal for pattern, "OK" or "reject" marking.

layout ink

Contact your distributor, or write:

Just Press the Trigger on the Can

CROWN INDUSTRIAL PRODUCTS CO.

809 Amsterdam St., Woodstock, III.

For more data circle 382 on Reader Service Card



mplest

answer

TO YOUR BEARING PROBLEMS

The availability of oil-filled, self-lubricating sintered powdered Bronze Bearings is greatly enlarged by the many sizes that are included in the new Bunting Standardized sintered Bronze stock line. Chemical and physical specifications of these Bunting stock bearings are ASTM-B202 Type I, Class A. The material also meets the requirements of SAE Type I Class A, AMS-4805 and MIL-B-5687A Type I Comp A. The basic composition is 90% copper and 10% tin of high purity.

This high quality powdered bronze with built-in lubrication together with Bunting Cast Bronze Bearings made of Bunting No. 72 Bronze (SAE-660) give mechanical production and maintenance the means of finding the simplest, best and most economical answer to any bearing problem.

BOTH Bunting Cast Bronze and Bunting oil filled, self-lubricating sintered powdered Bronze Bearings and Bars are available to you through your nearest Bunting Distributor. He has in stock all sizes for your immediate needs. Ask him or write for complete lists and dimensional data on Bunting Cast Bronze and Bunting Sintered Bronze Bearings.





Bunting

BUSHINGS, BEARINGS, BARS AND SPECIAL PARTS
OF CAST BRONZE AND POWDERED METAL

The Bunfing Bross and Bronze Company · Toledo 1, Ohio · Bronches in Principal Cities · Distributors Everywhere
For more data circle 383 on Reader Service Card

December, 1956

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an ideal size-sensing element for a large variety of gaging devices. The cartridge has a total stylus travel of approximately 0.110 inch. Pre-travel is approximately 0.005 inch. Depending upon amplification, effective gaging travel is up to 0.004 inch with an overtravel of approximately 0.100 inch. A positive stop at the end of the plunger over-travel protects the Electroiet against damage. The cartridge is sealed at both ends to prevent foreign particles from affecting the operation of the stylus.

The Accutron is a portable, lightweight electronic amplifier that operates on 110 volt, 60 cycle a.c. It is claimed to be unaffected by line voltage fluctuations from 65 to 150 volts. It has a specially designed electronic circuit with built-in voltage compensa-

> tion that permits extra-fast indication without drift or shift in amplification. This amplifier is available with dual amplifications of either 1,000 / 2,000; 2,500 / 5,000: 5/-10,000; 10/20,000; or 20/40,000 to 1. Amplifications within each dual range can be switched from one to another without realignment of the indicating meter mechanism. The 4 inch meter scales are available with graduations over a range of 0.001 inch for 1,000 to 1 amplification to 0.00000 inch for amplifications of 40,000 to 1. An optional outlet may be provided on the amplifier so that accessory equipment such as classifiers. computors, meter reading recorders and other instru-



How would one man alone handle a 500 lb. die without a





Order today performance guaranteed Specify 10 day free trial on your order

Use the SHOPLIFTER to avoid risk of painful accidents and to protect costly dies. Transport dies from storage area to press. To move dies in and out of press. Use it as an adjustable height bench for working on dies.

> Platform lift 4'-6", high enough for all press beds, yet overall height will clear any standard doorway. Width 24". Moves easily between machines — in confined areas.

> Spur gear hoist unit — most efficient hoist mechanism — lifts capacity load with only 20# crank pressure.

Friction disc clutch holds load securely — automatically.

Big safety factor for occasional overloading when necessary.

Dependable. Trouble free service for years. Low first cost combined with little or no maintenance cost. Simplicity of design. Any mechanic can disassemble and replace worn parts when necessary.

Three capacities to choose from

Type D (illustrated) 500 lbs.
capacity\$210.00

Type DX — 1000 lbs. capacity.... 405.00

Type DX — 2000 lbs. capacity.... 470.00
f.o.b. Chicago

ECONOMY ENGINEERING CO., 4507 W. Lake St., Chicago 24, Illinois

Eastern sales office, 342 Madison Ave., New York 17, N.Y.

For more data circle 385 on Reader Service Card

ments may be readily connected.

The Electrojet gage cartridge and the Accutron amplifier can be obtained separately.

For more data circle 94 on Reader Service Card



POINTED WIRE PRODUCTS AND NEEDLE POINTED PINS

Robert A. Main and Sons, Inc., 28 Pascack Rd., Paramus, N. J., is now producing pointed wire products and needle pointed pins from 0.020 to 7/16 inch in diameter and up to 18 inches long. Made to specifications in small or large quantities, the products are available in brass, carbon steel, stainless steel, Monel metal and heat treated steel. Types of parts which can be pro-

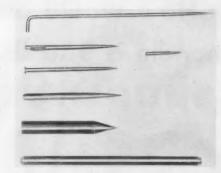
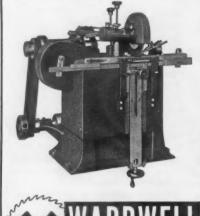


Illustration showing various Main Pointed Wire Products and Needle Pointed Pins

duced include perforating pins, long taper pins, U-pins, short taper pins, double-pointed pins, anil-type pins, fan-head pins, internal crimp pins, folded-head pins, pinned bars, pinned cylinders, pinned shells and various other parts.

For more data circle 95 on Reader Service Card



WARDWELL MANUFACTURING CO. 3803 Ridge Rd., Cleveland, O.

PAYS for ITSELF

Sharpen just one gross of hack saw blades (at least 6 times) and you actually will save the price of this machine.

WARDWELL MODEL EC COMBINATION GRINDER is the only single unit grinder adaptable for hack, band and circular saws that does not depend on the shape of the grinding wheel to form the shape of the tooth. This unique feature enables operator to grind a variety of blades without dressing or changing wheels.

Write for Bulletin EC Today

Maker of Largest Line of Saw and Tool Sharpening Machines

For more data circle 386 on Reader Service Card

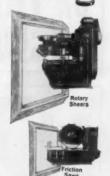


This "iack-of-all-jobs" will do the work of a half dozen machines. yet it does not take up any more floor space and represents very little more investment, than a shear or punch, or any other single-purpose machine.

Here is another production-boosting and cost-cutting feature: with this versatile machine two men, working on each side of the machine, can turn out the same or totally different jobs, at the same time! Enables you to double output, using your present staff.

Available in 3 sizes for light, medium or heavy work. Kling Combination Shear, Punch & Copers are speeding production and cutting costs "in the best of companies." Write us for names of some of these firms in your industry-and also for a copy of the New Kling Combination Bulletin No. 347-A.

For data on other Kling Metal Working Machines ask for Bulletin 100 Since 1892



Active Kiling Distributors cover practically every marketing area of U.S. and Canada. Write us for name of one nearest you.

1244 MM

BROS. ENGINEERING WORKS 1320 N. KOSTNER AVE. • CHICAGO 51, ILLINOIS
Exclusive Canadian Distributor: Brown-Boggs Foundry & Machine Co. Ltd., Hamilton, Onl.

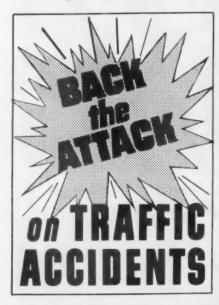
Export Distributor; Simmons Machine Tool Corp., 50 E. 42nd Street, New York 17, N. Y.

For more data circle 387 on Reader Service Card

PORTABLE ELECTRIC DRILL

Skil Corp., 5033 Elston Ave., Chicago 30, Ill., has introduced its Model 134 standard duty ½ inch portable electric drill, which the company is now offering as a companion tool to its heavy-duty Model 75.

Detailing the characteristics of the





View of Skil Model 134 Portable Electric Drill

Model 134, company engineers state that it has a newly designed motor, which is rated at 2.5 amps; a ball bearing spindle for long life and accurate performance; a scratch-free and glarefree Dura-Plastic finish; contour grip handle and trigger switch with locking pin; geared chuck and key for fast bit changing, and a large inspection plate, which is easily removed for servicing the tool. The well-balanced drill weighs only 31/4 pounds, which adds to the ease of handling and reduces worker fatigue. The standard speed of the tool is 1,800 r.p.m. Its capacity is 1/4 inch in steel and 1/2 inch in wood.

For more data circle 96 on Reader Service Card



MultiforM

Users report the Multiform Bender one of the handlest tools in the shop. No special tooling . . Bends, Cuts, Punches, Flats, Rounds into Any Shape, Clamps, Brackets, Springs, Busbars, Wire Forms, Aircraft Work, Steel Rule Dies, Etc.

AIR OR HAND MODELS FOR UP TO

1/4" to 4" MATERIAL
Write for brochure which illustrates
and describes the four bender models.

J. A. RICHARDS CO.

Dept. 6-M

Kalamazoo, Mich.

For more data circle 388 on Reader Service Card



"Magna-Sine"
Magnetic Sine
Plates for precision
set-ups grinding
single or compound angles.



Heavy Duty Sine Plates for angular machining. Wide variety of sizes. 12" square model shown.



Inspection Sine Plates for precision inspection and light machining on single or compound angles.

SI

Your First Choice
FOR ANGULAR TOOLING...ROBBINS!

Simplify

ANGULAR GRINDING

A look at the record shows exactly why Robbins equipment for angular tooling should be your first choice! Here's the record:

- 1 ST to originate the idea of a simple sine plate for faster angular toolroom set-ups—1936
- 1 ST to build these as a standard product for general distribution—1936
- 1 ST to build a non-magnetic sine plate designed specifically for precision inspection —1946
- 1 ST with a permanent magnet chuck-1948
- 1 ST heavy duty sine plate for angular machining —1954
- 1 ST and the only one with the exclusive "PERMA-FLAT" SWIVEL BLOCK—1956

Robbins is the only sine plate manufacturer with a complete line of sine plates for every angular set-up problem in precision machining, grinding and inspection. We also offer complete engineering and manufacturing facilities for the solution of special problems, and are now building high-production automatic assembly and other special machines. Send for sine plate literature, or send us details of your requirements in special machinery.

Simplify

ANGULAR

Simplify

ANGULAR

OMER E.

24800 PLYMOUTH ROAD

Kobbins

COMPANY

DETROIT 39, MICH.

Also manufacturers of special machinery, automatic assembly machinery

For more data circle 389 on Reader Service Card

GRANITE SURFACE PLATES PREVENT STICKING AND LAST LONGER

The Herman Stone Co., Dayton, Ohio, now produces a line of greygranite surface plates with 70.70 silica content. True granite or acidic granite



DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD Your business letterhead will bring literature.

WATTS BROS. TOOL WORKS Wilmerding, Pa.

For more data circle 390 on Reader Service Card



TOOL ROOM ACCESSORIES

C. I. HAND KNOBS



As shown. Also Scalloped Type. Fine grain cast iron. Smooth fin-

ish. No sharp edges. Many sizes. Low prices.

LONG SHANK

With Wrench Hex.

FREE 64 Pg. Cat.

Describes numerous items needed in tool rooms. Top quality. Low prices.

REID TOOL SUPPLY CO.

For more data circle 391 on Reader Service Card



View showing Stone Granite Surface Plate

containing quartz is typified by this high silica content as contrasted to softer diabase "granites" which have only 45 to 56 per cent silica content, lacking enough free silica to form quartz crystals. The presence of a high percentage of quartz in both true grev and pink granite is claimed to mean extra hardness and natural relief areas which prevent sticking. According to the manufacturer, special lapping as required in diabase, for relief of ringing action is eliminated. Long wearing qualities and smooth action of granites is now available in unlimited supply and size through exclusive arrangement with one of the world's largest open face granite quarry in Mount Airy, North Carolina.

For more data circle 97 on Reader Service Card

GRIND THE

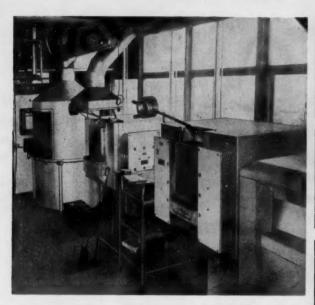
Eastern Centerless Way

Our new plant with increased facilities assures

PROMPT SERVICE

Eastern Centerless Grinding Co.
470 Tolland Street East Hartford 8. Conn.

For more data circle 392 on Reader Service Card









SENTRY Diamond Blocks ROTARY

...a size for every tool!

For maximum economy and satisfaction of operation, select the SENTRY Diamond Block best suited for the size tool you heat treat.

However, if you do not have a SENTRY Furnace as yet, it can be difficult to imagine the high degree of hardening perfection the SENTRY Diamond Block Atmosphere can achieve for you on your High Speed or High Carbon High Chrome steel tools.

We suggest the use of the proper

SENTRY Diamond Block for a specific size tool, because we know SENTRY owners are perfectionists. They want the best — that's why they bought the best: SENTRY Furnaces!

If you want perfection, simplicity of operation, outstanding economy and the ultimate in heat treating quality . . . then YOU want SENTRY — SENTRY Furnaces and SENTRY Equipment!

Learn about the best. Compare it with the rest. Send for



Request Catalog G-17

Write

Sentry ELECTRIC FURNACES

THE SENTRY CO. FOXBORO MASS.

For more data circle 393 on Reader Service Card



LAY-OUT DYE (Purple)

MICCRO Lay-Out Dye, long the leader in its field, now available in an AEROSOL package for SPRAYING.

All the advantages—instant drying; clear, sharp lines-plus easy-touse, dependable, efficient MICCRO Spray container.

Regular MICCRO Supreme Lay-Out and Identification Dye in seven distinctive colors available as always in brush-in-cap and conventional containers.

> Write for circular on company letterhead

MICHIGAN CHROME & CHEMICAL COMPANY

8615 Grinnell Ave., Detroit 13, Mich.

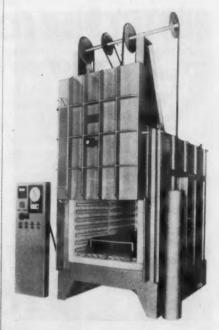
For more data circle 394 on Reader Service Card

new shop equipment . . .

FURNACE DESIGNED FOR MANY INDUSTRIAL HEATING OPERATIONS

The L and L Manufacturing Co., 136 Eighth St., Upland, 71 Delaware County, Pa., has announced a new furnace -the Model No. V3672 Special-designed for many industrial heating operations such as annealing, heat-treating, normalizing, annealing of glass and so on, where control over furnace gradients must be closely controlled. Temperature range is from 300 to 2,200 degrees F. Capacity is to heat 2,000 lb. of steel from 100 to 2,000 degrees F. in four hours.

The interior dimensions of this furnace are 40 inches wide by 36 inches



L and L Model No. V3672 Special Furnace

December, 1956

Specify...

WISCONSIN DRILL HEADS

for High-Production Drilling, Boring or Reaming

Wisconsin Adjustable Spindle Drill Heads, completely gear driven, are available in 5 Standard Models, with 2 to 8 Spindles and drill capacities from 1/4" to 11/2". They are equipped with both Locating and Locking **Fixed Center** templates, an exclusive patented feature.

May be adjusted to any hole pattern within range of head. Adjustable Heads with 9 or more spindles are built to order.

Wisconsin Fixed-Spindle Drill Heads are built to special order in any size or capacity for Drilling, Boring, Reaming, Spot-facing or Milling operations.



Adjustable, Multiple-Spindle Drill Head



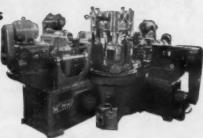
Drill Head

WISCONSIN Tapping Heads and Lead Screw Tapping Units are precision constructed for high speed production tapping.

WISCONSIN Special Machines Index Type and Fixture Bases

SPECIAL 4-WAY MACHINE

Drills and taps several different sizes of V-4 engine blocks. Machine and fixtures are designed to handle various sizes of V-4 engine blocks by the use of interchangeable fixed center drill and tapping heads.



Literature Sent Upon Request. Write -



WISCONSIN DRILL HEAD CO.

4983 NORTH 124th STREET . BUTLER, WISCONSIN

For more data circle 395 on Reader Service Card

A56-9029-1P

December, 1956

modern machine shop

257



LAY-OUT

(Purple)

MICCRO Lay-Out Dye, long the leader in its field, now available in an AEROSOL package for SPRAYING.

All the advantages—instant drying; clear, sharp lines-plus easy-touse, dependable, efficient MICCRO Spray container.

Regular MICCRO Supreme Lay-Out and Identification Dye in seven distinctive colors available as always in brush-in-cap and conventional containers.

> Write for circular on company letterhead

MICHIGAN CHROME & CHEMICAL COMPANY

8615 Grinnell Ave., Detroit 13, Mich.

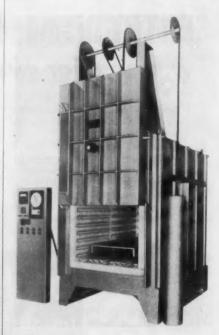
For more data circle 394 on Reader Service Card

new shop equipment . . .

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The interior dimensions of this furnace are 40 inches wide by 36 inches



L and L Model No. V3672 Special Furnace

December, 1956

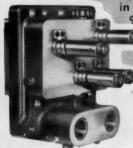
Specify ...

WISCONSIN DRILL HEADS

for **High-Production**Drilling, Boring or Reaming

Wisconsin Adjustable Spindle Drill Heads, completely gear driven, are available in 5
Standard Models, with 2 to 8 Spindles and drill capacities from ¼" to 1½". They are equipped with both Locating and Locking templates, an exclusive patented feature.

Adjustable, Multiple-Spindle Drill Head



May be adjusted to any hole pattern within range of head. Adjustable Heads with 9 or more spindles are built to order.

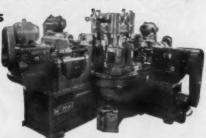
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WISCONSIN Tapping Heads and Lead Screw Tapping Units are precision constructed for high speed production tapping.

WISCONSIN Special Machines Index Type and Fixture Bases

SPECIAL 4-WAY MACHINE

Drills and taps several different sizes of V-4 engine blocks. Machine and fixtures are designed to handle various sizes of V-4 engine blocks by the use of interchangeable fixed center drill and tapping heads.





Literature Sent Upon Request. Write -

WISCONSIN DRILL HEAD CO.

4983 NORTH 124th STREET . BUTLER, WISCONSIN

For more data circle 395 on Reader Service Card

A56-9029-1P

December, 1956

modern machine shop

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high from top of hearth plate to spring of arch; 44½ inches to center of arch by 72 inches deep. Firing chamber temperature gradients are easily controlled by means of a system of input controllers, zone located thermocouples, a recorder controller and a thermocouple selector switch. There are four zones; the input to each is separately con-

trolled by means of an infinitely variable input controller so that fine gradient adjustments can be easily made and maintained. By this means also control over heat-up time, cooling time and other heat curve adjustments may be made.

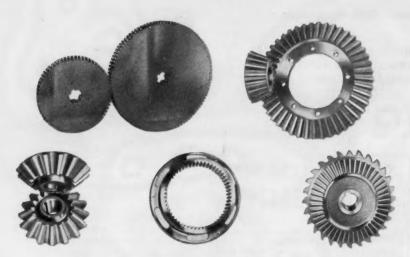
Completely automatic control is said to be attained by a unique combination of temperature controller with "straight line" adjustments and a precise 30 hour timer. The temperature controller, upon

its first impulse at the control point, starts the timer on its timing out cycle. When the timer has "timed out," the furnace is automatically shut off. At this point variable cooling off may be selected by setting the controller to the desired rate.

The elements are supported by means of specially designed "Dyna-Glow" element holders. These element holders have unusual heat transfer properties. A low mass characteristic keeps overshoot and undershoot of the temperature control point due to minimum heat storage in the element holders to a minimum.

For more data circle 98 on Reader Service Card





ADAMS quality control speeds up assembly time

Experience has proved that gears made *especially* for the job can often simplify and speed up assembly. Custom made gears can be designed with assembly problems in mind and can save hours and dollars out on the assembly floor.

While your product is still on the board, plan on using Adams precision made gears—built by craftsmen, *exactly* to your specifications. The Adams Company, 1942 Cypress St., Dubuque, Iowa.

The Adams line . . . Spur Gears . Helical Gears . Bevel and Miter Gears . Worms and Worm Gears . Sprockets . Internal Gears (spur and helical) . Ratchets . Splined Shafts . Lead and Feed Screws . Shaved Tooth Gears (spur and helical) .

Ground Thread Worms . Racks

The ADAMS Compa

Dubuque, Iowa, U.S.A.

FINE GEARS MADE TO YOUR SPECIFICATIONS

For more data circle 397 on Reader Service Card

December, 1956

modern machine shop

259

HIGH FLOOR CLEARANCE TRUCKS ELIMINATE PALLET DAMAGE

One of the most common complaints against the small hand motorized low lift pallet trucks is that pallet damage is high, especially with double face



For more data circle 398 on Reader Service Card

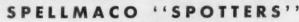


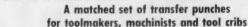
Lift Trucks "K" Hydroelectric Pallet Truck

non-reversible pallet. In order to correct this. Lift Trucks, Inc., Cincinnati 14, Ohio, has developed its high floor clearance "K" Hydroelectric Pallet Truck. This has completely new link action which is said to give a greater floor clearance at the critical spots during pallet handling operations.

In order to lessen the damage which occurs to the bottom boards on pallets because the operators fail, at times, to completely lower the forks, the company built into its hydraulic system a special automatic lowering control, which permits the pallet load to be lowered gradually to the floor or into position, and when the weight is released from the forks, the forks immediately drop down into their lowered position.

For more data circle 99 on Reader Service Card





Used for transferring location of threaded, drilled and reamed holes, slugs, blanks, etc.

Precision made of finest tool steel—Carefully heat treated and tempered for long life—.0025 undersize to facilitate use—Black oxide finish. SET #3-17; 28 punches with indexed stand—sizes 3/2" to 1/2", by 1/64"—plus handy 17/64" size. Length 47/8". ONLY \$16.80. Single sizes available

R. L. SPELLMAN CO. • URBANA, OHIO

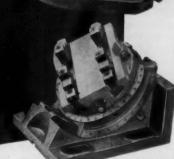
For more data circle 399 on Reader Service Card

260

Horizontal Swivel Type

MULTI-PURPOSE WONDER GRIP VISES

4 STEPPED JAWS PERMIT CLAMPING of rough castings, irregularly shaped, round, and tapered pieces accurately and quickly, eliminating need for special jigs or fixtures. Narrow stepped jaws allow free access to and measuring of work pieces and provide clearance for cutting tools. Small work pieces machined on three sides without reclamping. Easy and quick to mount and align on any machine. Holds rigid in any position without vibration. Various capacities and extra soft jaws available.



Horizontal & Vertical Swivel Type

Tested for Performance to High Amer. Standards Immediate Delivery from N.Y. Stock

MADE IN GERMANY

Low Competitive Prices

- Quick Change Chucks and Collets
- . Wille-Grip Keyless Drill Chucks
- Milling Machine Arbors, Adapters, Arbor Spacers and Bearings
- Lathe Mandrels





Our Headquarters in New York City

Write for complete details and prices to Dept. 20

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A Division of Machinery Builders Inc.
475 Grand Concourse, Bronx 51, N. Y.
"Over 20 years experience in
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TAPPING

ATTACHMENTS

Reversible safety tapping

attachments with adjust-

able graduated friction

drive, hardened, ground

and lapped, complete with torque bar and handles. Precision

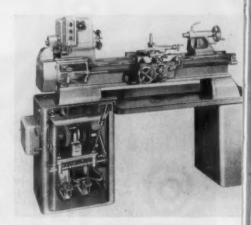
For more data circle 400 on Reader Service Card

made

throughout

SWING LATHE FEATURES HEAVY-DUTY VARIABLE SPEED DRIVES

The Sheldon Machine Co., Inc., 4250 N. Knox Ave., Chicago 41, Ill., has announced a new series of 11 and 13 inch swing lathes featuring heavyduty variable speed drives. These lathes have higher spindle speeds to permit infinite selection of speeds from 40 to 1,800 r.p.m. Speed changes are made visually and instantly by raising or lowering a T-handle speed selector lever. Actual spindle speeds are read on the large tachometer dial built into the headstock. Only nine seconds are required to change from low to high speeds in either direct drive or back gear. The spindle speed range is 200 to 1,800 r.p.m. in direct drive and



Sheldon WM56P Lathe with 13 inch swing

40 r.p.m. to 300 r.p.m. in back gear. In operation, the operator raises or lowers the selector handle (depending on whether he wants a higher or lower speed) and releases the handle



For more data circle 401 on Reader Service Card

to economize STANDARDIZE





precision PUNCHES and DIES

Ring Standardized Punches and Dies offer cost saving dependable performance for all of your perforating problems. Precision volume production to rigid specifications offers

- * Low cost
- * Complete interchangeability
- * Immediate shipments from stock on Standards plus prompt delivery on Specials
- * High quality long life MANY SHAPES AND TYPES





ROUND







Blanks — Pilots — Headless — Shoulder and Bevel Head Quills - Slug Ejector Punches -Transfer Punches

NEW!

Tough - Accurate Retainers for Ring Punches and Dies mount easily to your die set. Available in Key Type for irregular shapes.

WRITE FOR OUR ILLUSTRATED CATALOG

19 FENTON PLACE

For more data circle 402 on Reader Service Card

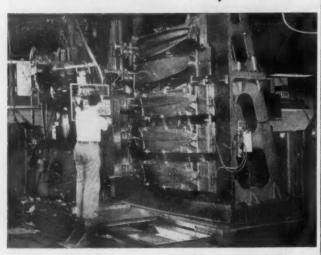
when the tachometer dial indicates the exact spindle speed desired. For certain production jobs, stops can easily be set for automatic selection of two predetermined speeds. High horsepower is claimed to be assured at all speeds by the oversize heavy-duty drive unit which takes a 2 h.p., 3 phase motor. Double V-belts throughout the drive from motor to spindle deliver maximum gripping power.

Other features of this series of variable speed lathes include "Zero Pre-

cision" tapered roller spindle bearings, a 54 pitch gear box and a friction disc clutch for engaging power longitudinal and power cross feeds. A complete range of toolroom and production accessories can be had to increase the work capacity and versatility of these lathes. These include flame hardened bedways, taper key drive spindle noses, bed turrets and air attachments. A variety of bed lengths are available with center distances of 26, 36 and 48 inches. These speed lathes are built to toolroom accuracy standards. Each lathe is inspected for 19 different accuracy tests and the actual test readings are sent with each lathe as a guarantee of its precision.

For more data circle 100 on Reader Service Card

Walker Does It Again --



Three WALKER electro-magnetic chucks mounted on milling machine, making possible profile milling three propeller blades in one operation.

WALKER engineers and makes chucks for unusual applications as well as standard holding devices for irons and steels, non-ferrous metals and non-metallic materials.

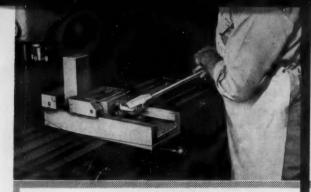
Whatever your holding problem the originators of the magnetic chuck will solve it for you.

O. S. WALKER CO.Inc.

WORCESTER 6, MASSACHUSETTS
Original Designers and Builders of Magnetic Chucks

IN CANADA — UPTON BRADEEN & JAMES, LTD.

For more data circle 403 on Reader Service Card



LARGE CAPACITY HALF THE WEIGHT MULTIPLE CLAMPING POWER FULLY ADJUSTABLE

New swivel milling vise

the only swivel vise that mounts flat on table ...

The New J & S CLAMPCUT Milling Vise multiplies the clamping and holding power expected of a milling machine vise. The powerful Acme threads tighten the adjustable jaw head and the patented down holding clamping jaws multiply the pressure.

Engineered and designed for full efficiency with a minimum of weight, nothing is wastedno part is non-functional. Many times the holding power of an ordinary vise, yet only half the weight.

EASY TO USE SNAPS TO WORK then tightens READILY DIS-ASSEMBLED REVERSIBLE JAWS

A quick-release taper swivel provides positive clamping in position with only two "T" bolts. The swivel is calibrated for full 180°.

This fast loading vise is provided with exclusive "snap-on" parallels that cannot be clogged with chips.

Holds round pieces in vertical position and has adjustable stop for repeating operations quickly and accurately.

J & S CLAMPCUT Vises come in two sizes for 12" capacity and 8" capacity. Write for complete details and prices.

Quick finger release for setting and resetting any position for full range of vise.

Distributors in all industrial areas.



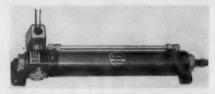


AM CLAMPS - PRECISION VISES - BOWN-HOLEBHO DEVICES CLAMPCUT and BAST

871 DORSA AVE. LIVINGSTON, NEW JERSEY

VALVE-IN-HEAD CYLINDER

The A. K. Allen Co., 57 Meserole Ave., Brooklyn 22, N. Y., has announced the Model SVS Single Solenoid Valve-in-Head Cylinder. The solenoid is designed for 110 volts, 60 cycles continuous operation and its operation controls the movement of the



Allen Air Model SVS Valve-in-Head Cylinder

cylinder rod when air is brought to the single port on the unit. The standard

> actuation being that each time the solenoid is energized, the piston rod of the cylinder goes forward and stays forward as long as the solenoid is energized. Breaking the electrical contact returns the rod to its original position. This valvein-head cylinder will operate on air pressures of 5 to 150 p.s.i. and the valve, itself, will cycle at 800 strokes per minute. The solenoid part of the valve is silent in operation and no air bleeds to atmosphere after the spool in the valve has shifted to either one of its two positions. The valve is an air return, four-way type and no springs are used in the valve construction.

For more data circle 101 on Reader Service Card



For more data circle 405 on Reader Service Card

Spin your RIVETS



faster and more economically on the NOISELESS LINLEY RIVETER

Rivet spinning on the Linley is a sure way to cut production costs. With Linley equipment, you can easily produce finely finished rivets even in close places. Send us samples of the work you want riveted, and without obligation we'll show you how it can be done the Linley-way and what it will cost.

Machines available for handling iron and cold rolled steel rivets up to ¾" and larger size rivets in softer materials.

Send for Bulletin R today.

LINLEY BROTHERS CO.

Also builders of JIG BORERS

671 State St. Ext..

Bridgeport 1, Conn.

For more data circle 406 on Reader Service Card

MOVE Any Machinery to 150 Tons with LESS EFFORT by EXPRESS ROLLERS



USED WIDELY RUGGED-SAFE

- ★ FIVE ranges of sizes: from 2 to 150 ton load
- capacity.

 IDEAL for shop, dock, freight operators.

 Handle, turn plate available little extra cost.
- ★ 2-TON CAPACITY. Set of 4 recommended. \$25 per unit. 150-Ton. 4 advised. \$175 each unit. (New Bar-Lugger also available)

write INDUSTRIAL EAST CO. P.O. Box 561, Clifton 2, N. J.

For more data circle 407 on Reader Service Card

BURR KEYSEAT MILLING MACHINE, PLANER TYPE

The Burr Keyseat Milling Machines while intended primarily for keyseating are suitable for a large variety of plain milling. They are made in six sizes from 36" to 144" table length. Also built to your specifications. This

is a sturdy, heavy-duty machine equipped with a vertical head and Timken anti-friction bearings throughout.

Also Burr Portable Shaft Keyseaters in five sizes for hand, drill and motor operation.

JOHN T. BURR & SON, INC.

Established 1890

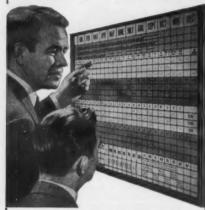
431 KENT AVENUE



BROOKLYN 11, NEW YORK

For more data circle 408 on Reader Service Card

You Get Things Done With **Boardmaster Visual Control**



- A Gives Graphic Picture of Your Operations — Spotlighted by Color
- ☆ Facts at a glance—Saves Time, Saves Money, Prevents Errors
- ☆ Simple to operate Type or Write on Cards, Snap in Grooves
- A Ideal for Production, Traffic, Inventory, Scheduling, Sales, Etc.
- A Made of Metal. Compact and Attractive. Over 100,000 in Use.

Complete price \$49.50 including cards

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GRAPHIC SYSTEMS

55 West 42nd Street . New York 36, N. Y.

For more data circle 409 on Reader Service Card

110 TON FIXED BASE SINGLE POINT GAP PRESS

A 110 ton capacity press of the fixed base type has been introduced by the Minster Machine Co., Minster, Ohio. It is an addition to the company's Series G1 Single Point Gap Press line which features an outstanding development in fabricated steel "C" frame construction. Design and construction is claimed to assure a minimum deflection under capacity loading. Unusually long press gibs and bronze lined ways, on the cast slide, maintain accurate slide to bed parallelism. Area of slide is 21 inches front to back by 28 inches left to right and area of bed is 27 by 42 inches. Slide adjustment is of the



View of Minster G-110 Single Point Gap Press



VERTICAL

At last, a top quality industrial sander that provides all the most wanted features - yet sells for so little. *89.95 complete with cord, plug, switch ready to use

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A few desirable distributor
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economically priced press room equipment

DURANTStock Oilers

Available in five sizes

—6, 8, 10, 12, 14 in.
wide. Eliminates hand
oiling. Prolongs die
life, cleans and lubricates in one operation. Priced from
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Manufacturers of Stock Reels, Roll Feeds, Straighteners, Scrap Choppers, Die Pullers, Foot Presses, Coil Cradles, Press Guards, Stock Oilers.



WRITE FOR NEW FREE CATALOG

DURANT TOOL SUPPLY CO.

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MULTIPLE DRILLING with a ...



Increases Capacity Up to 800%
ADJUSTABLE TO ANY HOLE PATTERN
... FITS ANY DRILL PRESS

If your production requires drilling from 2 to 8 holes in a work piece, a MULTI-DRILL will cut costs and speed output up to 800%. The MULTI-DRILL is universally adjustable to any hole pattern—is compactly built to permit easy, unhampered operation with drill jigs or other special fixtures. Ruggedly built to take the wear and tear of high production work, the MULTI-DRILL will handle your long and short run multiple drilling jobs with ease and economy. The MULTI-DRILL will drill on hole centers as close as ½"—handle drill sizes up to ¾" in steel. Special adaptations available.

COMMANDER MFG. CO.

Product of Commander - Builder of Production Tools

For more data circle 412 on Reader Service Card

barrel type and may be either manual by ratchet wrench or air power.

The press shown in the accompanying illustration is of the single geared type, operating at standard speed of 37 s.p.m. The combination air friction clutch and brake unit is mounted on the crankshaft within the main drive gear. The drive gear itself turns on anti-fric-

tion bearings and is totally enclosed, running in oil. According to the manufacturer, this arrangement makes it possible to offer variable speed operation, such as 37 to 74 s.p.m. with standard 5 inch stroke, thus increasing adaptability of press through selection of most suitable speed for operation being performed. Other advantages are less mass to place in motion when press is cycled and distribution of wear on gear. The press can also be obtained

in flywheel type, if desired.

Lubrication on the press shown is press driven cyclic type oil system. A recirculating oil system is also available. Die cushions, either frame attached type or sliding type, are available. This press, when equipped with the sliding die cushion and variable speed drive, becomes unusually versatile for either work requiring the slower geared speeds with die cushion or speeds of a flywheel type press having a bed opening.

The G1-110 press is also offered in the inclinable type. Centralized press controls are available to meet the particular requirements of the job at hand.

For more data circle 102 on Reader Service Card

Call on **CLARK**

for All Your "Rockwell Testing" Needs

CLARK Diamond Cone Penetrators are exactly right for your "Rock-well" hardness tester, whether or not it bears the CLARK name. Every step in their manufacture, from careful diamond selection to expert lapping, leads to a precision product that will give you precision results. Yet CLARK Diamond Penetrators cost surprisingly little.



CLARK Steel Ball Penetrators, for accurate "Rockwell testing" of unhardened steel, cast iron, brass, bronze, and similar materials, are available in all standard sizes.



CLARK Test Blocks, in various hardness grades, provide a quick, sure, and simple method of checking the accuracy of your "Rockwell" type hardness tester.

type hardness tester.

Write today for descriptions
and prices.



CLARK INSTRUMENT, INC. 10204 Ford Road • Dearborn, Mich., U.S.A.

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REDUCE Set-up Time and the need for expensive jigs & fixtures

HART MILLING FIXTURES

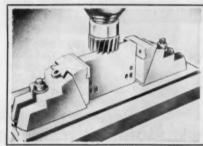
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Write for illustrated Folder Value proved by years of use.

WALTER W. FIELD & SON, INC.
39 Hayward St., Cambridge 42, Mass.



For more data circle 414 on Reader Service Card



MASTER GRIPPING CLAWS System Hubner WHY use them?

1. Clamping action Vertical as well as Horizontal — pressing workpiece down directly on the machine table. No hammering — no air between. 2. Gain more working room. 3. Faster and more secure setups. Easier to handle. 4. Unlimited jaw opening. 5. No straps overlapping on the workpiece; more machining surface. 6. Extremely versatile—take light cuts or heavy cuts, use on small machines or heaviest production machines.

Exclusive Agents
KARL A. NEISE

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MODIFICOIS

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It zips right through tubes from \%" to 1\%"
O.D., from light gauge to 16-gauge wall
thicknesses. Cuts up to 2,000 pieces an
hour, effortlessly, with just a stroke of the
handle. Convenient, adjustable table with
5 Dual-Roller Forks. Also available, CutOff Machines for pipes and tubes up to
12" diameter, air or hand-operated.



and we'll prove it!

Simply send us a sample of your tubes, we'll show you how clean and fast a Continental Rotary No. 1 Cut-Off Machine cuts, and return the pieces for your inspection along with actual time studies.

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Continental MACHINE CO.

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For more data circle 416 on Reader Service Card

STAMPING PRESS HANDLES LONG, UNBALANCED PROGRESSIVE DIES

Alpha Press and Machine, Inc., 9281 Freeland Ave., Detroit 28, Mich., recently introduced its 75 Ton Double-Crank, Direct-Drive Production Press. It is designed as a precision press and is said to handle long, unbalanced progressive dies without distortion.

The high precision press is only 7 feet 5 inches high with stroke and adjustment up. It requires only 68 by 95 inches of floor space. Furthermore, no pits are required. This press is operated at the shoulder level of the operator. According to the manufacturer, there is no overhead thrust on the head because the underdrive mechanism in

the base pulls the head down. The standard stroke is 2 inches; the maximum stroke is 4 inches; and the rated capacity of this efficient 75 ton press is 150 standard strokes per minute.

The four-post construction is said to assure perfect alignment of both the punch and die. The head rod guides are mounted in large bearings from the bottom cross beam to the head. Another -feature is the complete clearance between the head rod posts -from front to back and from right to left. The capacity point loading of this precision press can be handled. anywhere along the center line of the press, right to left and from columns to columns.

MERRY CHRISTMAS ★ HAPPY NEW YEAR



MAY YOUR
HOLIDAY
JOYS BE
MULTIPLIED!

want to lay aside business cares for the moment and join in spirit to celebrate the joyous Holiday Season. For you and yours may it be the best ever, full to the brim with deserved happiness and good cheer, and topped with the rich blessings of peace and good will.

To this is added our best wishes for a most Happy and prosperous New Year.

THEWELDON TOOL COMPANY

For more data circle 417 on Reader Service Card



For more data circle 418 on Reader Service Card

FORM and PUNCH SHAPER



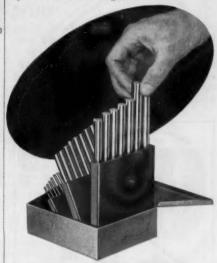
· 30 power built-in microscope for high precision close tolerances

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Jersey manufacturing co. 401-C LIVINGSTON ST. . ELIZABETH, N. J.

For more data circle 419 on Reader Service Card December, 1956

Now available in 182 standard sizes to meet vour exact requirements



hardened high speed steel DRILL BLANKS

These versatile, low-cost drill blanks are made of top quality, uniformly hardened high speed steel precision ground to exacting tolerances to meet the requirements of countless applications. Ideal for use as dowels, punches, knockout pins, gages, and rollers. Readily adaptable to form a wide variety of end cutting tools, too. And they're offered now in 182 standard stock sizes and in sets as shown-

Call your local Ace Drill Distributor today!



ORIGINATORS OF "GROUND-FROM-THE-SOLID" DRILLS For more data circle 420 on Reader Service Card

The pneumatic clutch and brake have been designed as a single synchronized unit. The air clutch is a combination flywheel type, air-operated with multiple friction discs, and synchronized with the multiple disc brake. The unit is mounted on anti-



THE TWO IN ONE

COMBINATION
ROTARY TABLE
AND
ANGLE PLATE
PRECISION
ACCURACY

WORM adjustable from 0 to 90 degrees.

> VERNIER control to within

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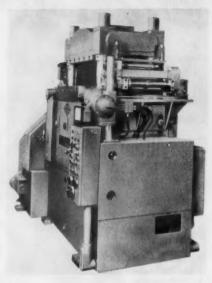
2 seconds of Arc.

Makers of Helical Gear Speed Reducers. Worm and Gear Speed Reducers. Standard and Special Gears. Wedge-Lock Turret for Lathes and Turret Lathes.

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OLSON INDUSTRIAL PRODUCTS, INC.

For more data circle 421 on Reader Service Card



Alpha 75 Ton Automatic Stamping Press

friction bearings. The clutch control provides for inching, single stroke, continuous operation and for forward and reverse operations.

Air counter balances offset the load of the heavy dies and the reciprocating parts. The shut height is generous and is limited only by the length of the guide posts. The shut height adjustment in the head is claimed to permit an accurate releveling of the upper ram in respect to the bolster plate. The



For more data circle 422 on Reader Service Card



For more data circle 423 on Reader Service Card



For more data circle 424 on Reader Service Card



For more data circle 425 on Reader Service Card

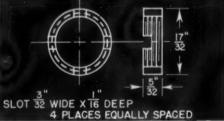


This piece was made from brass rod and slotted as shown in the print below. Production on this item was 1,200 pieces per hour.

DEARBORN **Automatic Chucking** and Indexing Fixture

FEATURES:

- 1. Work held by collets
- 2. Automatic opening and closing
- 3. Work automatically ejected
- 4. Automatic indexing if required
- 5. Three models with capacities from 1/32" to 2".

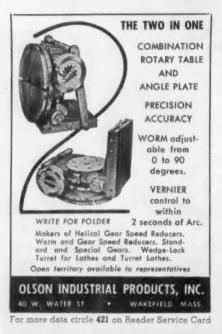


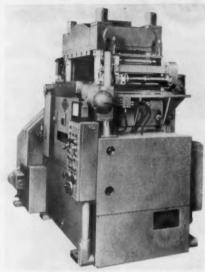
Write for illustrated data, Send blueprints or specifications of work.



For more data circle 426 on Reader Service Card

The pneumatic clutch and brake have been designed as a single synchronized unit. The air clutch is a combination flywheel type, air-operated with multiple friction discs, and synchronized with the multiple disc brake. The unit is mounted on anti-





Alpha 75 Ton Automatic Stamping Press

friction bearings. The clutch control provides for inching, single stroke, continuous operation and for forward and reverse operations.

Air counter balances offset the load of the heavy dies and the reciprocating parts. The shut height is generous and is limited only by the length of the guide posts. The shut height adjustment in the head is claimed to permit an accurate releveling of the upper ram in respect to the bolster plate. The



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For more data circle 423 on Reader Service Card

For more data circle 424 on Reader Service Card



For more data circle 425 on Reader Service Card



1200 PIECES

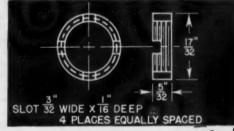
PER HOUR

This piece was made from brass rod and slotted as shown in the print below. Production on this item was 1,200 pieces per hour.

D E A R B O R N Automatic Chucking and Indexing Fixture

FEATURES:

- 1. Work held by collets
- 2. Automatic opening and closing
- 3. Work automatically ejected
- 4. Automatic indexing if required
- 5. Three models with capacities from 1/32" to 2".



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J. W. DEARBORN

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er, 1956 modern machine shop

PRECISION DRILLING MACHINE



- Precision ball bearing spindle with minimum run out
- Accurate mounting of head and column to insure squareness of spindle to table
- · Built-in gear drive for extra low speeds
- Convenient direct reading infinitely variable spindle speed control dial, together with a drill size, speed and material chart
- · Quick-set vernier depth control
- · Heavy construction to maintain accuracy
- Available in bench or floor models. (Floor model illustrated)

Write for More Descriptive Bulletin

The ELECTRO-MECHANO Co.

265 East Erie Street . Milwaukee 2, Wis.

For more data circle 427 on Reader Service Card

shut height lock is positive, when locked in position. The feed mechanism on the press is of the roll type and is designed as an integral part of the press. It is unusually rigid. It is connected to the crankshaft by a moving rack, which eliminates the lost motion encountered in the feed attachments that operate in several planes. This roll feed will handle metal up to 131/2 inches in width and up to 3/16 inch in thickness. In addition, the operation of this high speed precision press is claimed to be quiet at all times. Force feed lubrication to all moving parts is said to add to this quiet operation.

For more data circle 103 on Reader Service Card



CARBIDE DIE DRILLS FOR HARDENED DIE STEEL

Whitman & Barnes, 40500 Plymouth Rd., Plymouth, Mich., has announced a complete line of carbide die drills, specifically designed for drilling hardened die steel. According to the manufacturer, these drills permit hardened parts to be economically salvaged without annealing, reworking or rehardening. In addition, they can be used for cutting through hard outer cases and for drilling intricate parts in which it may be advisable to postpone drilling operations until after hardening, because of possible heat treat distortion. These drills are available in sizes 1/16 to 3/4 inch and in sets.

For more data circle 104 on Reader Service Card



View of Whitman & Barnes Carbide Die Drill

SAVE SET-UP



With REPCO LIVE CENTER SET

Set consists of heavy duty live center plus 6 interchangeable adapters from a point to 6½" dia. bell. Saves costly set-up and machining time often needed to make special, large diameter centers.

SIZES: 3 to 5 M. T. B&S, Jarno, and Straight Shanks available. Female and special centers on request.

WRITE FOR BULLETIN NO. 101 DEALER INQUIRIES INVITED

ROCKFORD ENGINEERED PRODUCTS CO. 2324 23rd Avenue . Rockford, Illinois

For more data circle 428 on Reader Service Card

DORMAN AUTOMATIC REVERSE TAPPERS

 Automatic Torque Control, One Minute to Adjust, Prevents Tap Breakage, Operator Need Not Be Skilled.

 WIDE RANGE TAP CAPACITY.

No. 1A FRICTION DRIVE

TAPPER — capacity No.

2-56 to 3/8" in Steel —
1/2" in Aluminum.

No. 2B POSITIVE TAPPER—capacity 3/8" to 7/8" in Steel.

No. 3A POSITIVE TAPPER—capacity 1/2" to $1\frac{1}{4}$ " in Steel— $\frac{1}{2}$ " to $\frac{3}{4}$ " Pipe Taps.

\$55.00 Write for Bulletin

No. 4A TAPPER — capacity 3/4" to 2" in Steel including Pipe Taps.

• PRODUCTION THREADERS with

PRODUCTION THREADERS with Round Split . . . Button . . . Acorn Dies.

THRIFTMASTER PRODUCTS CORPORATION

1034 N. PLUM STREET, LANCASTER, PA.

STANDARD UNIVERSAL ADJUSTABLE AND SPECIAL FIXED CENTER DRILLHEADS

For more data circle 429 on Reader Service Card

December, 1956

SPECIFY TOP QUALITY



ARBOR SPACERS

SHIMS and SPACING COLLARS • Arbor Spacers and Shims in 20 sizes and thicknesses from .001" to .125". Arbor Spacers furnished with standard keyway; Shims, with no keyway. Also Spacing Collars in numerous popular diameters, and in thicknesses from 1/4" to 3". Hardened and ground; edges chamfered. Furnished with standard keyway.



FEELER STOCK .

Made from tempered stock, rolled to close tolerances, ½" x 25' coils packaged in transparent plastic boxes, except above .020". Strips ½" x 12", in cellophane. 27 thicknesses. All thicknesses from .001" to .032". (For use in precision fitting, checking clearances, inspection and production work.)

SHIM STOCK .

Steel or brass. Selected from material rolled to precision limits, free from burrs, and protected by oil coating. Coils packed in carton for easy dispensing and protection. 15 thicknesses, .001" to .032". Sheets 6" x 12"; coils 6" x 120". Available also in two assortment packages—12 thicknesses, .001" to .015", and 15 thicknesses, .001 to .032".





DETROIT STAMPING CO.

349 MIDLAND AVE., DETROIT 3, MICHIGAN
For more data circle 430 on Reader Service Card

modern machine shop

277

CYLINDRICAL GRINDER FOR LARGE LIGHTWEIGHT WORKPIECES

A cylindrical grinding machine for precision grinding of large, relatively lightweight workpieces has been developed by the Norton Co., Worcester 6, Mass. The 30 inch Type LCTU Semi-Automatic Cylindrical Grinder is available in work lengths of 48, 72 and 96 inches, and will handle work up to 30 inches in diameter.

Wide tables and ways are built into the machine to provide rugged support to the work. Wheel spindles run in long, full bearings, pressure lubricated. Automatic or manual wheel feed settings are speeded by means of "click-

count" wheel feed index with which feed increments as fine as 0.0001 inch in work diameter reduction are set without visual attention. Wheel feed is accomplished by means of a rotating screw-type automatic wheel feed mechanism for maximum repetitive accuracy.

The automatic cycle is actuated with a single lever, located at the operator's position, and terminates either manually or by an electrically timed control. A jogging lever permits fractional rotation of the work to the most convenient position for loading or inspection.

The operation is further simplified by a preset table truing and grinding speed



Adjustable Hollow Mill
There is a size and style Genesee for every

hollow milling job. Standard sizes from 0 to 2", standard with straight or Morse Taper shanks carried in stock.

- Quick easy adjustment
 Simple sharpening method
- High speed steel cast-alloy
- -Carbide tipped blades
- Let our Engineering Department solve your Pro
 - duction tool problems

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GENESEE MANUFACTURING COMPANY

566 HOLLENBECK ST. . ROCHESTER 21, N. Y.

Adjustable Hellow Mills . Facing and Counterboring Tools . Special Production Tools

For more data circle 431 on Reader Service Card

TROYKE

WORM WHEEL OPERATED ROTARY TABLES

Precision ground tables at the lowest prices.



A size and type to meet your requirement.

*

For complete information and prices write for Free Catalog No. 22.



TROYKE MFG. CO.

11296 Orchard Street Cincinnati 41 (Sharonville), Ohio

For more data circle 432 on Reader Service Card

Cut Costs on Hole-Cutting!
USE THE BOREMASTER

Finished holes 1½" to 11¾" diameter to a depth of 8" on your present equipment.



BOREMASTER is not just another Trepan-

ning Cutter, but a real heavy duty tool. Stock is removed in one piece eliminating waste. Remember

TIME SAVINGS + MATERIAL SAVINGS = COST SAVINGS

Write us today for complete details!

Also without pilot, and shorter shank for Turret Lathes, etc.

NEISE MODERNTOOIS KARL A. NEISE 404 4th Ave., Dept. MMS, New York 16, N. Y.

For more data circle 433 on Reader Service Card

GREENLEE HAND BENDER



for quickly making smooth small-radius bends in pipe, tubing, conduit

Forming small-radius bends without flattening or kinks is simple, speedy work with a GREENLEE Hand Bender. Ideal in the shop for pipe and tubing installations on machines... especially designed to form neat bends for sharp corners, nooks and other close quarters. Various models and sizes for steel, copper, brass and aluminum tubing or pipe, rigid and thin-wall conduit



GET FREE FOLDER E-207 AND BOOKLET E-201. Complete facts and prices on the Greenlee Bender line, Write Greenlee Tool Company, 1992 Herbert Avenue, Rockford, Illinois.

For more data circle 434 on Reader Service Card

control feature. This is said to permit maintenance of separate table speeds for truing and grinding as set from the first workpiece. It provides either speed immediately thereafter by short movement of the table control lever. Constant resetting of table speeds is avoided. Work rotation start-stop and coolant flow cycle are controlled automatically with the grinding cycle or manually, as desired. A selector switch is provided for this purpose.

A wide variety of optional accessories for the 30 inch LCTU increases its efficiency for special jobs. Locating devices, automatic wheel truing, automatic compensation of wheel head setting after truing and a lever-operated



View showing the Norton 30 inch LCTU Semi-Automatic Cylindrical Grinding Machine

device, which moves the grinding wheel into a shoulder to be ground, are available as extras.

For more data circle 105 on Reader Service Card



JIG BORING

and

Large Precision Machining

Done to your specifications

We Have 21 Jig Borers

KIDDE PRECISION TOOL CORP.

15 LOCUST AVENUE ROSELAND, N. J.

For more data circle 436 on Reader Service Card

SUPERIOR® INDICATOR

A Low-Priced Dial Type Indicator
Has 2 contacts 1/32" threaded
within ½". Double Faced, Reads
front and back. Two Crystals.
Double faced dial indicator complete with plated holder including 1/32" and ½" contects —
Superior Indicator #50...\$8.95
Superior Indicator #75X

with Universal Swivel. \$10.95 Thousands of satisfied customers!

SUPERIOR INDICATOR CO. P. O. Box 734, Rochester 3, N. Y.

OR Patratel

For more data circle 437 on Reader Service Card



for nut countersinking

Two KENT machines are available—the smaller for nuts up to $\frac{3}{4}$ " hexagon—the larger for nuts up to $\frac{1}{16}$ " hexagon.

Hopper fed. Duplicate work spindles countersink both sides of nuts simultaneously giving fast, economical production.

The KENT MACHINE COMPANY Cuyahoga Falls, O.

Drillers - Threaders - Slotters - Countersinkers - Bar Pointers

For more data circle 438 on Reader Service Card

Write for bulletin.



MANUFACTURERS OF
Precision Machinery and Machine Parts
Roller Bearing Twister Spindles—Spindle Olling Machine
—Screw Machine Products.

MAGNETIC BRAKE FOR HAZARDOUS AREAS

A magnetic disc brake for use in hazardous locations is offered by Stearns Electric Corp., Milwaukee 46, Wis.

The brake is designed for application on electric motors to be operated safely in atmospheres where combustible dust creates a hazard to men and equipment. The brake is designated "dustignition-proof," for use in Class II, Groups E, F and G hazardous locations as defined by the National Electrical Code. The manufacturer points

out that now design engineers and motor manufacturers can safely provide the instant stop-start and holding advantages of magnetic disc brakes used on electric motors.

Offered in the 70 Series with maximum torque ratings of 10, 25, 50 and 75 ft. lb., floor or motor mounting, the dust - explosionproof brake supplements a complete line of standard magnetic transmission equipment for use on 1/20 to 100 h. p. motors.

For more data circle 106 on Reader Service Card



Stearns Series 70 Magnetic Disc Brake



Get the complete, revealing

Inside Story.

on the finest tapping heads ever made!

A complete feature by feature analysis on the amazing Procunier Tapping Line is yours for the asking! Shows the many outstanding construction improvements, mechanical advancements and precision quality operating advantages that make Procunier heads a "must" in production plants everywhere! You'll learn why Procunier means more tapping hours with minimum "down-time", faster production, with fewer broken taps, fewer spoiled pieces and a "now-found" operating ease that helps operators maintain stepped-up production schedules.

Write for FREE Brochure giving full details and specifications on the Procunier Line.



Provides perfect tapping action close to walls and shoulders.

Double End Reversible Gage Handle

PROCUNIER

SAFETY CHUCK CO.

12 S. Clinton St., Chicago 6, Ill., Dept. 12

For more data circle 441 on Reader Service Card

GAGE HANDLES and BLANKS

available for immediate delivery

Also available
Trilock and Spline
Gage Handles

A. G. D Standards Single End Go Reversible Gage Handle

Taperlock Gage Handle



Established 1938

Write for Catalog

Royal Oak Products Co.

28282 John R St. (P.O. Box 161) Royal Oak, Michigan Phone Lincoln 2–1780

manufacturers of gage handles and blanks

For more data circle 442 on Reader Service Card



A home appliance manufacturer was using four screw-machine stations for centering, drilling, counterboring and reaming for brass components. To increase output of the machines, Woodruff & Stokes was asked to design a combination tool to center, drill, counterbore and ream in one operation. The resulting tool cost half as much as the four tools it replaced, cut production time by two-thirds, by making double indexing possible.

Chances are, a tool designed by W & S small tool specialists can streamline your own production. Our tool specification sheet makes it easy for you to find out.



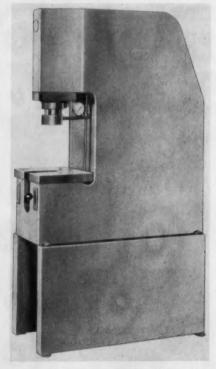
For more data circle 443 on Reader Service Card

modern machine shop

new shop equipment . . .

71/2 AND 15 TON HYDRAULIC PRESSES

The addition of two new models to its 10 and 20 ton line of "Proven Power" Hydraulic Presses has been announced by Northern Tool and Machine Co., 1545 North 31st Ave., Melrose Park, Ill. These presses are ideal for operations such as broaching, staking, forming, pressing, embossing, burnishing, assembling, drawing, crimping, trimming, bending, peening, marking, straightening, punching, extracting, in-



Northern "Proven Power" Hydraulic Press

December, 1956



CAP SCREWS . COUPLING BOLTS
SET SCREWS . MILLED STUDS

. . . our specialty

*Wm.H. Ottemiller co.

For more data circle 444 on Reader Service Card

economically priced press room equipment



DURANT Wire Straighteners

Takes round or flat wire and tubing. Five models available. Each unit consists of two sets of 5, 7, 9 or 11 grooved rolls.

Manufacturers of Stock Reels, Roll Feeds, Straighteners, Scrap Choppers, Die Pullers, Foot Presses, Coil Cradles, Press Guards, Stock Oilers.

WRITE FOR NEW FREE CATALOG

DURANT TOOL SUPPLY CO.

PROVIDENCE 3, RHODE ISLAND For more data circle 445 on Reader Service Card

December, 1956

HIGHER SPEEDS! FASTER GRINDING!

kipp

AIR GRINDERS

MODEL JA 50,000 R.P.M. \$4200 IN U.S.A.

Weight 12 ounces; length 6¼ inches;

chuck size 1/4 inch. Wheel guard removed

The RPM's stay up while grinding . . . not only when the grinder runs idle. That means

better work—longer wheel life. High speed grinding with small wheels was a Madison-Kipp development of the late twenties. It was born out of a pressing need in our tool room. Because tool room grinding problems are universal, we believe it will pay you to utilize Kipp grinders in your tool room as generally as we do in our own.



MADISON-KIPP CORP.

208 Waubesa St., Madison IO, Wis., U.S.A.

For more data circle 446 on Reader Service Card

modern machine shop

285

jecting, disassembling, molding, stamping, testing, shaping and swedging.

According to the manufacturer, the operation is simple and efficient. A slight movement of the control lever starts the ram in motion. The ram may be slowed or stopped at any point in its travel for work inspection or test

alignment. At the bottom of the stroke, the control lever is released and the ram returns automatically to a pre-set stop. This stop may be set any distance from ½ inch to the full stroke of 12 inches. New construction has minimized shock and heat factors. Frames are of rugged construction and are claimed to be able to stand force far in excess of rated tonnage. The ram guide and adapter are one piece. This

SHUSTER wire straightening and cutoff NEWS!

NOW! ELECTRICALLY CONTROLLED CLUTCH AND TARGET ON INFINITE SPEED

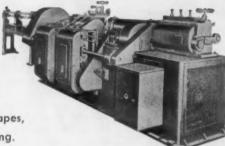
SHUSTER

3 AV

SHUSTERS

for .025" to

flat stock, tubing.



Variable speed of feed and cutoff is individually controlled. And now, with electrical control of clutch and target, the 3AV straightens and cuts wire (1/4" to 1/2") with great accuracy and efficiency.

METTLER MACHINE TOOL, INC.

157 Adeline Street New Haven, Connecticut

For more data circle 447 on Reader Service Card

TOOL, INC.

nage adjustment. Valves are mounted inside the frame and are placed in such a way as to keep oil lines as short as possible. The 71/2 ton model is available with closing speed up to 265 i.p.m., pressing speed up to 240 i.p.m.. and return speed up to 400 i.p.m. The 15 ton model is available with closing speed up to 270 i.p. m., pressing speed up

prevents the ram from rotating, ac-

tivates the return stroke stop and provides adequate

space for attaching tooling, indexing head and so

on. The power unit is quiet and

compact. A pressure relief valve is furnished for ton-

345 inches per minute. For more data circle 107 on Reader Service Card

to 120 i.p.m., and return speed up to



MARK OF QUALITY

STANDARD

TAPER PINS



The high quality and accuracy of Standard Steel Specialty Taper Pins have won them wide acceptance. Milled from bor stock, straight to taper and to extremely close tolerances, these pins give 100% performance. The uniformity and accuracy of the pins saves valuable time at assembly, assuring you trouble free service.

Write for complete catalog giving information on taper pins. Woodruff keys, machine keys and machine racks.

STANDARD STEEL SPECIALTY CO.

Plants: Bower Fulls, Pag Hammond, Ind.

For more data circle 448 on Reader Service Card

HELIOS PRECISION DIAL CALIPER

Guaranteed Accuracy Within .001" Reading .001"

- SPEED
- PRECISION
- DEPENDABILITY

Full scale readings of 5"-6"-8"-10" available. Also Foot with Scriber to convert to Vernier Height Gage.

Ask for catalog and prices of other Standard Calipers.



\$31.80

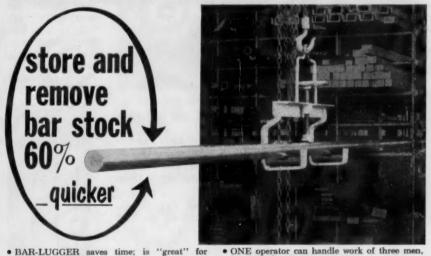
F.O.B. New York

NEISE

KARL A. NEISE 404 4th Ave., Dept. MMS New York 16, N. Y.

For more data circle 449 on Reader Service Card

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- BAR-LUGGER saves time; is "great" for speeding production.
- STORE and remove up to 6" hex, square or round stock. Handles up to 2,000 lbs.
- SIMPLE hook-up to overhead conveyor. Indispensable—a real work-saver. Rugged.

Available on prompt delivery at \$84.50 ea. Literature describes fully. Write INDUSTRIAL EAST CO., P. O. 561, Clifton 1, New Jersey.

For more data circle 450 on Reader Service Card

in same time.

COMBINATION CENTER DRILLS

Circular Tool Co., Inc., Providence 5, R. I., is now producing its Hi-Spiral Center Drill in both regular and arbor types, which are available in all the diameters and lengths presently in regular demand and in special sizes made to order. Made of high-speed steel, the new drill is said to be designed for maximum ease in clearing chips in order to produce superior finish and performance.

For more data circle 108 on Reader Service Card

* * *

COLLET ARBOR AVAILABLE IN SIZES TO 61/4 INCH

The N. A. Woodworth Co., 1300 East Nine Mile Rd., Detroit 20, Mich., is

now offering its "Tork-Lok" Collet Arbors in four additional sizes. ranging from 2-9/16 to 61/4 inches. The new sizes include three styles: namely, between centers, flangemounted draw bar and air-operated. For use with the new sizes of arbors, 120 "Tork-Lok" collets have been added to the company's line of products.

For more data circle 109 on Reader Service Card



Moveable TORIT units let you trap dust at its source

Untrapped dust costs you money: "secretly" forces your precision machines out of alignment, slows production, hurts morale. Torit dust collectors solve the problem—fit in almost anywhere. Usually more efficient and money-saving than central (built-into-the-building) systems.

You can move and install Torit units yourself. We'll check the installation—or handle the entire problem if you prefer. Torit units operate only when machines they protect are in use. Filtered air may be returned to room to save heat. Many models and sizes, all self-contained, easy to move. Write today to . . .

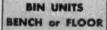


Woodworth "Tork-Lok" Collet Arbor



TORIT MANUFACTURING CO.

Dept. 703, 296 Walnut Street, St. Paul 2, Minn. For more data circle 451 on Reader Service Card





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FIVE SIZES of removable BIN BOXES

Visible parts handling saves time and money!

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#2 Morse Taper \$15.00

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Hardened and ground • Sealed roller ball bearings • Accurate free-turning point Precision made in Western Germany

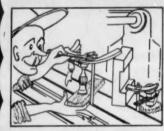
For tremendous savings, write for circular listing sensational bargains.

MANHATTAN SUPPLY COMPANY

The Cutting Tool Discount House 151 A GRAND ST., NEW YORK 13, N.Y Telephone: CAnal & 4992

For more data circle 453 on Reader Service Card

WHY WASTE YOUR PROFITS ON MAKESHIFT SETUPS?

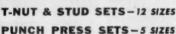




NORTHWESTERN







STEP BLOCK & CLAMP SETS - 5 SIZES

CATALOG No. 23 SENT ON REQUEST

119 HOLLIER AVE., DAYTON 3, OHIO



For more data circle 454 on Reader Service Card

new shop equipment.

UNIVERSAL BED TYPE MILLING MACHINE

Sundstrand Machine Tool Co., 2539 Eleventh St., Rockford, Ill., has announced its Universal Bed Type Milling Machine. Designated as the Rigidmil, the machine combines longitudinal feed of the table, cross feed of

the column and vertical feed of the head. These feed motions are provided by motors independent of the spindle motor, thus providing full horsepower to the spindle.

The machine shown in the accompanying illustration, in addition to the wide range of feed movements, has an all angle ram type head. This head is adjustable through an arc of 360 degrees both parallel and crosswise to the machine table to give practically any

cutting angle desired. When not in use, the head can be retracted to clear the horizontal spindle.

Twenty - four speed changes are available on both the horizontal spindle and the all angle head in a range from 14 to 1.450 r.p.m. with changes made from a selector switch on the control pendant. With the main spindle the horsepower range is 1 h.p. per r.p.m. up to 50 h.p. maximum, and with the all angle head 1/2 h.p. per r.p.m. up to 20 horsepower maximum.

With fixed height bed design. cutter is positioned to work for convenience of loading large workpieces and easier observation of cutting operations.

LUBRICATION ECONOMY

"With LUBRIPLATE LUBRICANTS No Bearing Loss For An Entire Season"

says Cotton Gin and Oil Mill Manufacturer

ALSO MAKES CARS AND TRUCKS RUN BETTER AND LAST LONGER LUBRIPLATE H.D.S. MOTOR OIL . . THE OIL THAT NEEDS NO DDITIVES MODERN LUBRICAL

"After extensive testing of many greases, we found that LUBRIPLATE Lubricants were the only ones that stand up under all operating conditions throughout an entire season without loss of a single bearing."

- 1. LUBRIPLATE reduces friction and wear.
- 2. LUBRIPLATE prevents rust and corrosion.
- 3. LUBRIPLATE is economical to use.

Write today for case histories of savings made through the use of LUBRIPLATE in your industry.

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NO SLEEVES! GUARANTEED

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GS INC. 1339 Bates Avenue Cincinnati 25, Ohio Cincinnoti 25, Ohio

For more data circle 456 on Reader Service Card

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surfaces. Available with "SHUR-GRIP" drop forged handles.

Write for circular and prices LAWRENCE H. COOK, INC.

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For more data circle 457 on Reader Service Card

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illustrated booklet provides practical information on the use of the famous A. C. M. I. Borescope in various industries, for the inspection of interior areas or surfaces not otherwise visible-together with full data on the types of Borescope available, and on their care and maintenance. Have you received your copy?

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entlemen: Please send me wit	

Address City.

For more data circle 458 on Reader Service Card

December, 1956



Letters and figures, deep-cut in hardened, special-formula steel, assure clean impressions and long service. Wide range of letter sizes. At your Mill Supply or write for circulars.

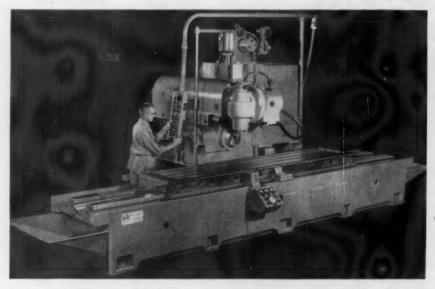
HOGGSON & PETTIS MFG. CO.

New Haven 7, Connecticut

For more data circle 459 on Reader Service Card

modern machine shop

291



Sundstrand "Rigidmil" Universal Bed Type Milling Machine with All Angle Ram Type Head

Bed type design is also said to make possible the use of a wider table and longer table feed strokes.

Feed movements are infinitely variable—within the machine range—with control switches on the pendant for fast easy selection of the feed desired. The

machine is equipped with vernier scales for table, column and head positioning. This milling machine has been designed with mechanical screw feeds for ready application of controlled tracing and programming.

For more data circle 110 on Reader Service Card

A Simple Formula for Solving Tooling Problems



HEINRICH TOOLS, Inc. Dept. 116-M RACINE, WIS.

For more data circle 460 on Reader Service Card



Supersensitive **Hand Tapper**

New exclusive features and top augiity make Lassy Tappers outstandingly the finest available.
Write for illustrated circular showing 3 models, and also Universal Tap and Die Guide.

For more data circle 461 on Reader Service Card

LASSY TOOL COMPANY, Plainville, Conn.

Magnetic Base Indicator holders



50 lb. pull base CULLEN MFG. CO., RACINE, WIS.

For more data circle 462 on Reader Service Card

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Punches & Dies

Powerful

mean savings for you.

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(2) Because standards are made in large quantities.

prices are surprisingly low-quality of the highest. 68 years of experience goes into every Lewthwaite tool -and it shows! Catalog Sheets On Request.

317 East 47th St. • New York 17, N. Y.

H. LEWTHWAITE MACHINE CO.

For more data circle 463 on Reader Service Card

SOLVES MISALIGNMENT

On tapping and reaming jobs, the Ziegler Tool Holder makes possible the highest standards of precision because it automatically compensates not only for misalignment of the work with the spindle but also for misalianment resulting from the machine getting out of level.

As a consequence, it greatly shortens set-up time. Then too, by reducing spoilage losses and reducing the replacement of guide bushings, the Ziegler Tool Holder pays for itself very quickly. Try it and see!

Types to fit any machine used for tapping or reaming.

Prompt Delivery

Taps and Reamers ...

13566 AUBURN DETROIT 23, MICH.

W. M. ZIEGLER TOOL CO.



For more data circle 464 on Reader Service Card

NEW BACKSTAND IDLER IS VERSATILE AND EASY TO OPERATE

A backstand idler, specifically designed to provide maximum operating convenience and flexibility as well as optimum trouble-free performance as a belt idler for grinding and polishing lathes, has been announced by Fenlind Engineering Co., 5602 Pike Rd., Rockford, Ill. An unusually long lifetime is claimed to be assured by this versatile idler through the use of boots and seals which protect all working parts from dust, dirt, abrasive particles and so on. Known as the

Fenlind L-160, it incorporates a number of features which make it adaptable to any application, from precision work with narrow type belts to heavy roughing operations.

Linkages, consisting of telescoping remote control arms and universal joints, permit the mounting of both tracking and tension arms at any position above or on the front of the polishing lathe - to suit the operator's convenience. The telescoping feature facilitates adjustment of the control arms to accommodate belts of any length.

Both lateral and radial adjustments of the pulley are effected through a patented tracking linkage which is operated by a single tracking control

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AIR AND HYDRAULIC

CYLINDERS

now "in stock" for immediate shipment to you in popular sizes, mountings

Eliminate costly production delays—speed-up your design and replacement programs—with this greatest quality selection ever offered on such fast delivery service.

AIR CYLINDERS, 200 psi, 1½" through 8" bores, strokes up through 36", over 15 popular mountings, cushioned and non-cushioned.

hydraulic cylinders, 2000 psi, 1½" through 5" bores, strokes up through 36", over 15 popular mountings, cushioned and non-cushioned.

Larger bores (up through 20" air, 12" hydraulic) and longer strokes (up to 22 feet) available on longer delivery.



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For more data circle 465 on Reader Service Card

arm. This feature provides precise adjustment of the pulley for all type and weights of belts from ½ to 6 inches in width. A leather boot fits over the tracking linkage, protecting it from excessive wear as a result of dust, dirt and other foreign matter.

Belt tension is adjusted by means of the other remote control arm. A rugged, springloaded device on the idler is said to make possible a complete range

of adjustments, from an accurately controlled light tension for narrow
belts to a much
greater tension for
wide belts. The
adjusting screw
which controls
this mechanism at
the idler is protected by an accordion type neoprene boot.

The heavy-duty aluminum alloy pulley of the L-610 is radially crowned for perfect trackage and prevention of wear. It is 10 inches in diameter and 6 inches wide. This pulley is dynamically balanced and is provided with sealed precision bearings. Shield caps protect the bearings from dust, dirt, abrasive particles, sanding refuse and belt grease. A zerk fitting is provided for

greasing the bearing. Under normal use one shot of grease per week is the only maintenance required.

According to the manufacturer, the sturdy, heavy-duty base of the L-610 not only gives maximum support and accessibility to the idler, but also supports the idler in such a position relative to the contact wheel that it assures belt wrap-around at the proper position on the contact wheel for all



modern machine shop



View showing Fenlind L-610 Backstand Idler

operations. The idler can be mounted readily at any distance behind the pol-

ishing lathe as required by a belt of any length. Total weight of the Fenlind L-610 is 74 pounds.

For more data circle III on Reader Service Card

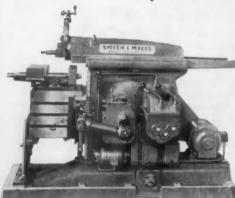
ATTACHMENT FOR HOLE-LOCATION GAGES

Sorensen Center-Mikes, Inc., 264 Kossuth St., Bridgeport 8, Conn., has introduced the Booster-Bar, a new accessory which is said to permit measuring greater center-distances with Center-Mike hole-location gages. There is a Booster-Bar for each of the three standard Center-Mike sizes. The largest Booster-Bar adds nine inches to the measuring range of the A12 Center-Mike, raising it from 12.4 to 21.4 inches.

Each Booster-Bar assembly has two

SMITH & MILLS SHAPERS

for production and tool room



Ram, bull gear, rocker arm and universal table trunnion made of nodular iron for extra rigidity. Compare Smith & Mills with any other shaper for versatility, speed, cutting power and precision performance. Compare and you'll buy Smith & Mills—famous for high quality shapers since 1888. Write or wire for prices, deliveries, repair parts or field service. Smith & Mills Shaper Division, Nebel Machine Tool Corp., 3409 Central Parkway, Cincinnati 25, Ohio.

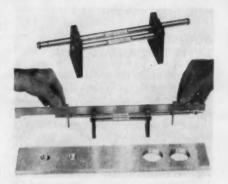


For more data circle 467 on Reader Service Card

precise-length rods held in plastic brackets that are slotted to hold the Center-Mike in the second step of the measuring sequence: (1) Adjust Center-Mike to the farthest-apart points on the two holes; (2) Quick-set Center-Mike to one Booster-Bar rod; (3) Adjust Center-Mike to the nearest-together points on the two holes; and (4) Read Center-Mike and add the "round" number marked on the rod. Result is center-distance.

The two rods—one long one short—give coverage for all combinations of hole diameters and center-spacing, from the normal range-limit of the Center-Mike alone to the extended range limit supplied by the Booster-Bar.

Because it is a separate accessory, the Booster-Bar allows unhampered freedom in adjusting the Center-Mike to the work. With it the Center-Mike has the same speed, accuracy and op-

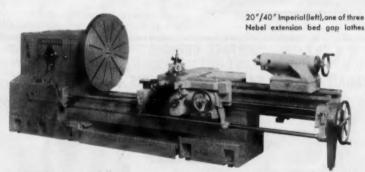


View of Sorensen Booster-Bar Attachment for use with Center-Mike hole-location gages

erating simplicity, plus the great range utility. Each unit comes in a mahogany case which is designed to protect the unit from damage.

For more data circle 112 on Reader Service Card





Nebel double duty extension bed gap lathes

You can (1) turn your outsize, odd-shaped parts in the wide, deep gap of Nebel extension bed gap lathes. And (2) with the gap closed, you can do all your engine lathe work, too. Double duty means lower capital investment, more efficient use of floor space. Sizes 20°/40° and 28°/50°. Nebel removable block gap lathes 16°/27°. 20°/30°. 25°/40°; engine lathes 16° to 36°. Write for bulletins. Nebel Machine Tool Corp., Cincinnati 25, Ohio.



For more data circle 468 on Reader Service Card

AUTOMATIC BENCH VISE SAVES TIME AND MOTION

The WiltOmatic air hydraulic vise, manufactured by Wilton Tool Manufacturing Co., Inc., Schiller Park, Ill., is claimed to eliminate the wasted time and labor of manual clamping and speed production on a wide variety of bench operations. Assembly, testing, finish grinding, cut-off work and many other jobs that require frequent clamping and unclamping of the workpiece can be speeded up by the WiltOmatic, which will open and close up to 2,000 times an hour at the touch



For more data circle 469 on Reader Service Card



WiltOmatic Air Hydraulic Bench Vise

of a foot pedal air control. Maximum jaw locking force varies between 2,513 to 6,891 lb., depending upon selected size. Since locking force varies directly as the air input pressure, it can be reduced to prevent damage to soft workpieces. The main screw and nut of the vise are engaged at all times, and jaws can be preset to any desired opening, thereby eliminating setup time between runs of different size workpieces. Power stroke is adjustable up to ½ inch, although recommended power is only ½ inch, preventing any possibility of finger injury.

For more data circle 113 on Reader Service Card



For more data circle 470 on Reader Service Card

SPECIAL ABRASIVE BELT GRINDER FINISH GRINDS MOTOR ROTORS

Through the use of a specially fixtured abrasive belt grinder, small electric motor rotors can be quickly finish ground to 0.0001 inch concentricity tolerances. This new adaptation, developed by The Engelberg Huller Co., Inc., 110 Seneca St., Syracuse, N. Y., is a modified platen-type machine equipped with oscillating hydraulic in-

feed table and pneumatic cylindrical grinding fixture.

Rotors, ranging in size from 3/8 inch stack (width) to 11/2 inch stack, and from 1/2 inch diameter to 11/2 inch diameter, are multiple loaded on a slide fit arbor and inserted in carbide-lined blocks of a work holding form. The air-operated cylindrical grinding fixture, mounted on the automatic infeed table, consists of three rubber wheels, 6 inches in diameter, with 11/2 inch face. The regulating wheels, operating at 12 r.p. m., revolve the rotors against the abrasive belt. which is backed by a hardened steel platen with 1/2 inch carbide insert behind the contact area.

The modified Engelberg Model BG8/FT9 is equipped with a two-speed hydraulic in-feed table. From the load position, the first speed allows for rapid approach to the grinding belt; a microstop regulates the second or machining speed as the revolving rotors are moved in against the belt until a predetermined size is reached. At the same time, to equalize belt wear, rotors are moved back and

"Standard"

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Brown & Sharpe-NELCO-manufacturing over 3000 Carbide, Carbide Tipped and High Speed Steel milling cutters and accessories-stand behind the distributor displaying this plaque.

You can rely on him to save you days and dollars with superior tools, superior service!

Use the tools that really give you a COMPLETE selection...a speedy solution to all your cutter problems—over 3000 "standards" are as near as your phone.

Switch to the most complete source! See the Brown & Sharpe-NELCO Distributor in your area...today!

SEND for the New Nelco Catalog just off the press, showing over 700 Carbide Tipped Cutting Tools.



NELCO TOOLS

For that EXTRA Edge in Production!

NELCO TOOL CO., Inc. . Manchester, Conn

For more data circle 471 on Reader Service Card

forth across the belt face by means of an air cylinder oscillator attachment on the machine table.

The machine permits concentricity tolerances down to 0.0002 inch, and diameter tolerance of plus or minus 0.0005 inch. The complete grinding



For more data circle 472 on Reader Service Card



Engelberg Modified Model BG8-FT9 Abrasive Belt Grinder for grinding motor rotors

cycle—loading, grinding and unloading—requires about 12 seconds. Depending on the width and diameter of rotors, production rates can exceed 2,000 rotors per hour.

For more data circle 114 on Reader Service Card



SLOTTING MACHINE IS UNUSUALLY RUGGED AND ACCURATE

A 36 inch stroke Model SA Hy-Draulic Slotter is now being manufactured by the Rockford Machine Tool Co., Dept. X, 2500 Kishwaukee St., Rockford, Ill. The model is an unusually rugged, accurate machine, handling with ease large awkward work, irregular sections, internal surfaces, as well as angular and rotary cuts.



For more data circle 473 on Reader Service Card

This machine features a unique combination of mechanical leverage and hydraulic control for the ram drive. The patented torque arm drive is said to permit an infinite speed adjustment from 40 to 100 f.p.m. with constant horsepower characteristics. Speeds below 40 f.p.m. are available by means of a flow control valve. Ram reversals are fast, smooth and accurate over the full range of the machine and the entire machine is built for heavy-duty

slotting work up to its maximum capacity.

All machine controls are conveniently located in relation to the operator. Cutting speed and all power movements for the machine are controlled at the overhanging pendant. Any cutting speed within the range is said to be obtained quickly by simple adjustment. A cutting indicator on the column indicates the approximate ram speed being used. Start and stop levers are installed on both sides of the machine column.

The machine is provided with wide range longitudinal and transverse table travel, plus 360 degree rotary table movement. A dividing head provides

for the accurate spacing of keyways, serrations, gear teeth and other jobs requiring precision indexing.

Other features include power rapid traverse in all directions, stroke length adjustment when the ram is in motion, a mechanically balanced ram with a tilt of 10 degrees from vertical. Positioning or adjustment of the ram involves but three steps. These are: angular position of the ram; height of the ram as established by position of the



Enco Turrets Assure ±.0005" Accuracy



Enco's passion for exacting accuracy is paying off in metal working operations everywhere! Combining precision lathe output with efficiency and economy has become a necessity . . . and Enco turrets have proved the ideal answer. An Enco turret transforms one lathe into a production machine, each operation of unsurpassed accuracy due to spring loaded ball design!



Spring loaded balls give you the accuracy you want! Hardened steel precision balls locked between accurately milled spherical seats consistently give accuracy in re-indexing. Hardened all steel construction minimizes wear, retains built in precision.

Write today for catalog No. 53. There's an ENCO turnet for every lathe.

ENCO

Manufacturing Company, 4520 W. Fullerton Ave. Chicago 39, III., Dept. 1126

For more data circle 475 on Reader Service Card

new shop equipment . . .

ram housing in relation to the table; and length of ram stroke. The ram stroke control is mounted on the side of the column and the ram stroke can be adjusted and set any time to suit the work.

A 15 h.p. variable delivery, radial piston pump is used for hydraulic power. Electrical equipment is standard, single direction with simple, conventional control. The main castings are semi-steel, adequately ribbed for maximum rigidity. Automatic pressure lubrication is provided for the ram-ways, the bed-ways and the saddle-ways.

For more data circle 115 on Reader Service Card

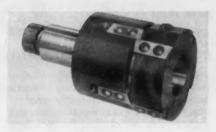


View of Rockford Model SA Hy-Draulic Slotter

RELEASING TYPE TAP HOLDER SPEEDS MULTIPLE SPINDLE SCREW MACHINE OPERATIONS

Marcellus Manufacturing Co., Belvidere, Ill., has recently introduced a multiple-spindle releasing-type tap holder for screw machine use. The holder operates on a simplified principle that is claimed to eliminate many moving parts, minimizing wear and maintenance and extending the service life and efficiency of the tool.

According to the manufacturer, this tool can be changed quickly and simply for right or left-hand tapping, thereby saving setup time. It automatically disengages at a predetermined tap depth to hold consistent tolerances on tapping operations. The positive reversing mechanism is claimed to eliminate binding to reduce tap breakage. The extra rugged construction and rigidity of the tool is further increased by util-



View of Marcellus Releasing-Type Tap Holder

izing a floating bushing to compensate for misalignment of the tap and the work.

The model shown in the accompanying illustration has a $1\frac{1}{2}$ inch hole and shank and includes a $1\frac{1}{2}$ inch bushing. The same model is also available in a $2\frac{5}{8}$ inch shank. Other sizes are available in standard or special shanks.

For more data circle 116 on Reader Service Card



MONEY-BACK TRIAL OFFER

Order a trial gallon of each today for testing in your shop. We'll cancel the bill if you're not satisfied.

cut weld cleaning time by 85%

Throw away your cold chisel and whisk off weld spatter with a dry rag! Protect-O-Metal spatter-proofing compounds make weld cleaning a breeze. Improve your welds at the same time . . . P-O-M compounds quiet the arc, improve fusion and electrode operation, prevent oxidation and annealing scale, cause no porosity. No smoke odors, or fumes.

P-O-M No. 2. Non-inflammable, non-toxic water-soluble paste. Inorganic. Thin before applying and start welding at once. \$3.30 per gallon, f.o.b. Dayton.

P-O-M No. 8. Rust- and corrosion-resistant resin base compound. Comes ready to use. Safe for all metals. Good paint primer; permits outdoor storage of subassemblies. \$3.35 per gallon, f.o.b. Dayton.

PROTECT-O-METAL

G. W. SMITH & SONS, INC.

5407 KEMP ROAD, DAYTON, OHIO

For more data circle 476 on Reader Service Card

INDUCTION HEATING EQUIPMENT

Lepel High Frequency Laboratories, Inc., 55th St. and 37th Ave., Woodside, N. Y., has developed a production fixture to braze metal assemblies without the use of flux, by induction



For more data circle 477 on Reader Service Card

CONN.

ELISHA PENNIMAN

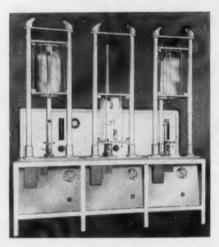


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> HI-DUTY DRILL WORKS FLEETWOOD, PENNSYLVANIA

For more data circle 478 on Reader Service Card



View showing Lepel Induction Heating Fixture

heating under a controlled atmosphere. The joints produced with this unit are uniformly sound and freed of residual or entrapped flux. They are required in numerous assemblies to insure dependable corrosion-resistance and strength in critically stressed inaccessible parts. Such joints are impossible to achieve with normal brazing techniques. In addition, this process leaves a smooth fillet and is said to eliminate the cost of cleaning as well as the cost for fluxing.

Combining induction heating, which provides rapid localized heating, and a controlled atmosphere, this unit has





. . . to YOUR specifications

You can call on Rowbottom for cams in any and all types and quantities. As specialists in designing and producing cams, you can send us your drawings and specifications and be assured of prompt service and competent adherence to your needs. Ask for estimates.

THE ROWBOTTOM MACHINE CO., Waterbury, Connecticut Also Cam Milling and Cam Grinding Machines. Ask for details.

successfully joined copper alloys, steel and stainless steel assemblies on a production basis. The three work stations are operated from a single induction heating unit. High frequency current is fed to the work coils through coaxial leads. The proper atmosphere is obtained by directing a continuous flow of purified gas into the glass or plexiglass bell. The flow of gas is controlled by the flow meters at each of the three work stations, allowing the gas to enter through the top, spreading over a diffusion plate and escaping through the bottom. The glass bells are counter-weighted to move freely on the posts to facilitate the handling of the work. In the accompanying illustration, the bell on the left is in a loading position and the bell on the right in a heating position. The heating cycle is automatically controlled at each station by pre-set timers thus enabling one operator to work all three stations.

For more data circle 117 on Reader Service Card

MUFFLE FURNACE FOR CONTINUOUS OPERATION **TO 1,850 DEGREES FAHRENHEIT**

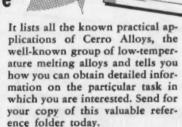
A large size automatically controlled muffle furnace for continuous operation to 1,850 degrees F. has been announced by Hevi Duty Electric Co., Milwaukee 1, Wis. This modern styled furnace is a completely self-contained. compact unit with all the necessary temperature indicating and accurate control devices located in the pyramid type furnace base. Power input is controlled by a 36 step tap-changing transformer. This, along with the controlling pyrometer, is claimed to assure very close temperature regulation.

According to the manufacturer, the benefits of this round model are rapid heating and improved efficiency because additional graded insulation is placed above, below and on the sides of the heating chamber, where it is most needed: consequently, radiation

Stymied?

Maybe CERRO ALLOYS can do that job Look for the answer here

If your problem is a metal-working operation such as securing shaft bearings; anchoring magnets in chucks, instruments, etc.; providing fusible element in safety devices; soldering delicate assemblies; or any one of some 63 industrial tasks that are being done efficiently and economically by Cerro Alloys, send for this folder.





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For more data circle 480 on Reader Service Card



Centerless Ground to extreme accuracy.
 Special new-type Equipment, assures concentric chamfered or formed ends—no cut-off burrs.

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Taper Pins

Diameter up to .1875". Length to 1". Taper Tolerance .0001" in length of Pin. Diameter Tolerance .0005".

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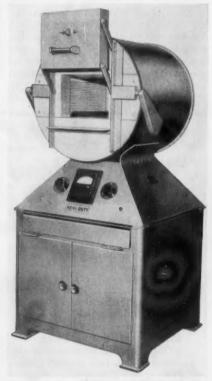
For more data circle 481 on Reader Service Cara

new shop equipment . . .

losses are said to be reduced to a minimum.

The heating chamber—inside dimensions 11 by 14 by 8 inches—is formed by four long life "Multiple Unit" heating units which can be arranged to expose the element or reversed to form a muffled chamber. A tight fitting counterbalanced hinged style door swings to an upward position, keeping the hot side facing of the door away from the operator.

For more data circle 118 on Reader Service Card



Hevi Duty Muffle Furnace has automatic control temperature range to 1,850 degrees F.

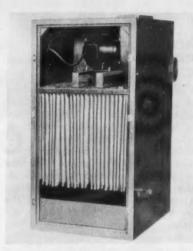
306 modern machine shop

December, 1956

STORAGE CAPACITY INCREASED ON DUST COLLECTORS

Torit Manufacturing Co., 296 Walnut St., St. Paul 2, Minn., recently announced that all "Series 80" cabinet cloth-filter dust collectors have been redesigned to permit over 21/2 times more dust storage capacity. Three models-81, 83 and 84 — are affected by the change, which will jump the capacity of each collector from 3/4 to 2 cubic feet. Each of the collectors has 150 square feet of cloth filtering area, with filters made from woven cotton, chemically treated for spark resistance, and each cabinet measures 491/4 by 281/4 by 28 inches. Internally mounted motors and fans move from 580 to 1,100 c.f.m. of air through the filters at speeds of 5.000 to 8.000 f.p.m.

All models in the series have a manual starter with overlead protection, foot pedal for shaking filters clean, solid steel cabinets and inside exhaust.



Torit "Series 80" Cabinet Dust Collector

where regulations permit. Explosionproof motors are optional. For more data circle 119 on Reader Service Card

100% guaranteed!

repeats to .0001" in 30 seconds



ONLY DEKA-BORE

Offset Boring Head

- Can be adjusted in fractions of 1/10,000" on the full diameter as easily as reading 1/16" on a steel rule. Not a vernier or scroll adjustment.
- Can be calibrated in increments of .00005 on radii or .0001 on diameter as easily as picking up .002 on a conventional micrometer dial.

Attach this ad to your letterhead and mail for a free demonstration or literature!

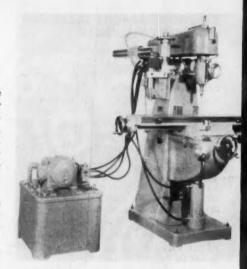
For more data circle 482 on Reader Service Card

TRACER ATTACHMENT ADDS AUTOMATIC CONTROL TO VERTICAL MILL

The U. S. Vertical Milling Machine may now be equipped with a tracer attachment for automatic control. According to the manufacturer, U. S. Burke Machine Tool Division, Cincinnati 27, Ohio, the machine is now available with a Turchan Follower jack screw type, knee hydraulic attachment. Chosen after extensive experimentation, it is claimed that the knee type follower permits more accurate work than raising and lowering the quill while machining operations are being performed.

The tracer system controls the vertical rise and fall of the table. It is actuated by a hydraulic cylinder, mounted in place of the vertical mill's present vertical screw. Cylinder movement is governed by the tracer valve, working from a model or template located on the machine table. The stylus, which governs the vertical movement of the table, is set in the same plane as the milling machine spindle.

The range and capacity of the mill are said to be in no way limited by the automatic control. Under normal machining conditions, the depth of cut can be controlled to within a tolerance of plus or minus 0.001 inch. The ma-



View showing U. S. Vertical Milling Machine equipped with tracer attachment

chine table may be manually fed or its longitudinal movement mechanically controlled by the use of the standard variable speed table feed accessory.

Use of the vertical mill with the tracer attachment is said to simplify the machining of multiple molds, dies or production runs of complex parts. According to the manufacturer, it will facilitate the production of parts that are now extremely difficult to machine with manual control.

For more data circle 120 on Reader Service Card



Chuck work with gage block accuracy. No hammering or fussing. 80% faster than any other holding device.

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ILLINOIS METAL PRODUCTS 433 W. Superior Street, Chicago 10, Illinois

For more data circle 483 on Reader Service Card



B.M.W. single spindle
AUTOMATIC SCREW MACHINE

1/2" capacity; speeds to 5,800 r.p.m.



B.M.W. GEAR DEBURRING MACHINE

For deburring gears and sprockets.

Outstanding... New... Machinery at Low Cost.

\$1.00 BUYS ANY MACHINE upon termination of 3 year Rental Plan

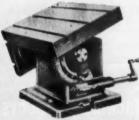
HAAS
UNIVERSAL TOOL & CUTTER GRINDER



STARRETT — Dividing Heads, Tilting Tables, Box Tables



from \$349.00



3 sizes available from \$468.00



3 sizes available from \$179.00

AARON MACHINERY CO., INC.
Dept. M • 45 CROSBY ST., NEW YORK 12 • WA 5-8300

SEE PAGE 313

Branches: Buffalo, N. Y.; Mineola, N. Y.; Los Angeles, Calif.

LIBERAL

EXPANDED LINE OF TAP DRIVERS

Three additional styles of "Safe-Torque" tap drivers are being offered to industry by Scully-Jones and Co., 1909 South Rockwell St., Chicago 8, Ill. The three new styles are: tension and compression type, quick-change

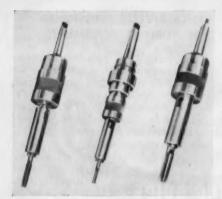
type and heavy-duty type. Basically, "Safe-Torque" tap drivers feature an overrunning roller drive design that releases instantly and completely when preset torque is reached. The drive consists of a drive shell, single or double set of rollers, and inner cam drive collet. Torque is transmitted when the rollers are wedged between the drive shell and raised cams on the drive collet. All parts deform elastically when rollers climb into the wedging position.

When torque reaches the setting, the rollers roll past the high points on the cam and are locked in a "free" position. In the "free" or free-wheeling position, no torque istransmitted from drive to tap and the driver continues to rotate on anti - friction ball bearings. The freewheeling action permits operator to bottom-tap at high speeds without breaking taps.

The "Safe-Torque" design is also claimed to protect against possible tap breakage resulting from the following commonly encountered conditions: hard spots, chip interference, inadequate cooling or lubrication, excessive thread length in relation to tap diameter, and dulling or im-



For more data circle 485 on Reader Service Card



Scully-Jones "Safe-Torque" Tap Drivers, (Left) Tension and Compression Type, (Center) Quick Change Type and (Right) Heavy-Duty Type

proper sharpening of the tap. According to the manufacturer, tension and compression type tap drivers readily compensate for variations in feed be-

tween spindle and tap and release at preset torque rating when the hole is tapped. The tap floats in and out of the hole without overcutting or undercutting the flanks of the thread. When bottoming in a blind hole, the tension and compression feature cushions the shock and enables the tap to jump away from the last thread when being withdrawn. Two sizes offered range from No. 10 to $\frac{5}{8}$ inch; torque ranges from 50 to 700 inch-pounds.

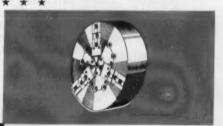
Quick-change type tap drivers are said to permit tool change without stopping the machine, thus speeding sequence operations involving drilling, reaming and tapping. They are also shorter and have smaller diameter than other drivers of the same capacity. Three sizes are available for tap range from No. 10 to 1 inch. Torque range is from 40 to 1,900 inch-pounds.

Heavy-duty type tap drivers featur-

...precision
and power for
high production







Accurate, safe, dependable, fast! Sizes, 6" to 24" with forged steel bodies, 2 and/or 3 adjustable, non-adjustable or serrated jaws. Power chuck available in 2- and 3-jaw compensating models for holding rough castings and forgings between centers. Double-acting rotating air cylinders available for all Skinner power chucks.

Write for free catalog and for showings of film, "Chucks and Their Uses".

KINNER CHUCK COMPANY
210 Edgewood Ave., New Britain, Conn.

For more data circle 486 on Reader Service Card

ing the rugged double roller design provide quick and easy adjustment in addition to constant torque setting even on the toughest jobs. Two sizes cover tap range from ½ to 1½ inches and torque range from 500 to 2,400 inch-pounds.

For more data circle 121 on Reader Service Card

BENCH RIVETER REDESIGNED FOR POSITIVE ALIGNMENT

Redesigned for positive alignment and maximum length of service life, the Airflex "SPB" 7 inch throat Bench Series Riveter has been offered by The Lemert Engineering Co., Inc., 201 East Jefferson St., Plymouth, Ind., in a new rugged steel and semi-steel model. The bench riveter, of the Airflex "original

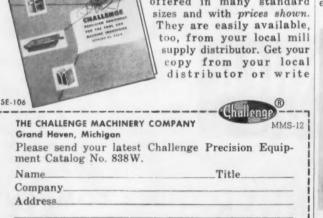
spin - impact" design, can be obtained in three capacity sizes for solid or hollow rivets 1/32 through 1/4 inch, based on solid mild steel. Units are currently available from stock in limited quantities.

Operation of the spinning (500 r.p.m.) and impacting (to 16,000 b.p.m.) tool is powered entirely by air (30 to 80 p.s.i.) and the riveting head is fed



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Here's the easy way to fill your precision surface equipment needs!
This handy 16 page condensed catalog covers one of the broadest lines of surface equipment available today. Surface plates, bench plates, angle plates, box parallels, V-blocks, straight edges and many other types are offered in many standard sizes and with prices shown. They are easily available, too, from your local mill supply distributor. Get your copy from your local distributor or write





Airflex "SPB" Riveter



PRECISION BORING
MACHINE
\$2405.00



BEST VALUES IN U. S. A.

New Features—High Quality

STARRETT



Sizes 2 ½' to 6' from \$1769. to \$6595.

AT LOWER COST!

\$1.00 BUYS ANY MACHINE son termination of 3 year Rental Plan STARRETT Optical Jig Borer



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SEE PAGE 309

Branches: Buffalo, N. Y.; Mineela, N. Y.; Los Angeles, Calif.

LIBERAL TERMS



STRAIGHT SHANK MACHINE COUNTERSINKS

HIGH SPEED STEEL

4 FLUTES

Cuts ½" to 1". Furnished with 60, 82 or 90 degree included angle. Specify desired degree of angle. Large stocks on hand.

Jobbers' Inquiries Invited

KEO CUTTERS

19326 Woodward - Detroit 3 Mich

For more data circle 489 on Reader Service Card



For more data circle 490 on Reader Service Card

new shop equipment . . .

manually by hand lever. Foot pedal and linkage can be supplied. The unit is compact, requiring space approximately 11 by 13 by 27 inches high. Crated weight is about 400 pounds.

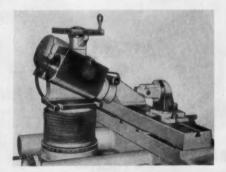
Performance of the unit is suited equally for the needs of a small shop or large plant with short production runs requiring both hollow and solid rivets to be set without cracking, chipping or flaking in parts made of fracturable or ordinary materials.

For more data circle 122 on Reader Service Card



TOOL AND CUTTER GRINDER FEATURES 25 DEGREE TILTING SPINDLE

Easier set-ups, fewer set-up changes and greater versatility are said to be major advantages of the 25 degree tilting spindle of the Sterling G-2 Tool and Cutter Grinder recently announced by the manufacturer, McDonough Manufacturing Co., 1521 Galloway, Eau Claire, Wis. Direct, positive setting of clearance angles



View of Sterling G-2 Tool and Cutter Grinder equipped with 25 degree tilting spindle

without the use of formulas is claimed to speed set-ups and insure more accurate grinding. Because the clearance angle is set by tilting the spindle, it is not necessary to change the setting for different diameters of work. (A 3 degree clearance angle setting remains the same for a ½ inch reamer and a 10 inch mill.)

In addition to tilting, 25 degrees at

one end and 15 degrees at the other, this spindle is reversible and rotates a full 360 degrees. According to the manufacturer, other features that add to the versatility and capacity of the machine are a 10¾ inch swing, improved massive anti-friction table with dual controls making operation easy from any position.

For more data circle 123 on Reader Service Card



CUT ASSEMBLY TIME 55%

AT ALLIED CONTROL CO.

PLANTSVILLE, CONNECTICUT

Case History M-100

PROBLEM: A nylon-encased component for an electrical relay to be precision sized by milling both ends.

SOLUTION: Two PRECISE SUPER 50 POWER QUILLS mounted through plane mounts above and below working surface. Relay part is inserted between two .087" diameter carbide end cutting mills — milling completed to close tolerance as fast as operator can load and unload the fixture. Actual reduction in assembly time over previous method of operation — 55%!

Other Power Tools from 1/5 to 11/2 H.P. and complete line of accessories described fully in our catalog, available Free on request.



SUPER 50 POWER QUILL PRECISION Features

- 1. Super Speeds—to 45,000 RPM at high torque under load.
- 2. Precision ground satin chrome finished Steel Housing only 21/2" D. and 91/2" overall length.
- 3. Ground and honed Collet Chuck with up to 1/4" capacity.
- 4. Available with complete line of mounts, filtration units and electric speed controls.
- 5. Used singly or in multiple set-ups.
- 6. Micro precision ball bearings with sealed-in lifetime lubrication insure chatter-free, vibration-less running, making possible tolerances of .0001".



PRECISE PRODUCTS CORP.

3745 BLUE RIVER ROAD, RACINE, WISCONSIN QUALITY AND PRECISION SINCE 1882

For more data circle 491 on Reader Service Card

PRESSROOM UNIT HANDLES STAINLESS STEEL, ALUMINUM OR BRASS WITH NO SCUFFING

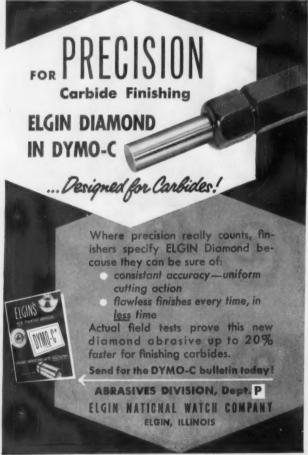
Sesco, Inc., 8881 Central, Detroit 4, Mich., has announced a pressroom unit, known as the "Sesco-Matic," for handling stainless steel, aluminum or brass. The unit, which is self-contained and

can be moved readily from one location to another, incorporates three sections, each of which performs a distinct and an important function.

In the first section of the unit, and completely built-in, is a Sesco stock lubricator and the lubricant tanks. The lubricator submerges the stock; lubricates it completely, on both the top and the bottom; and then efficiently removes the excess lubricant. The proper level of the lubricant is always maintained.

A reciprocating pump collects the overflow of lubricant from the bottom tank and returns it to the upper tank for reuse. The reciprocating pump is activated from the gripper head.

In the second section of the unit, and likewise built-in, is the Sesco scuff - free hydraulic doublegripper feed. An accurate feed stroke is obtained through the adiustable hydraulic cylinder. There is a two-piece piston, mounted in tandem, inside this cylinder. The distance between the two pistons can be changed by turning a stroke adjuster handle, which is mounted on the side of the feed unit. Positive internal stops assure the exact duplication of



For more data circle 492 on Reader Service Card

the stroke length. Thus, it is possible to feed within 0.003 inch of the selected setting every time. To prevent heavy impact at each end of the cylinder, shock absorbers are incorporated.

Reciprocating travel of the pinch gripper is governed by the stroke adjustment within the cylinder. A 4 to 1 ratio between the feed-in cylinder and the pinch grip, assures scuff-free operation. Through proper sequencing, the pinch grip takes place before any forward feeding is possible, and the grip is not released until the forward motion of the gripper head is reversed. Consequently, the momentum of the stock is not allowed to create any overtravel at the end of the feed-in stroke. Release of the stock is completed before the return stroke begins. With the hydraulic double-gripper feed, hard or soft stock can be fed without danger of marking, scuffing or scratching.

In the third section of the unit, and likewise built-in, is the Sesco precision cut-off, which is sequenced with the feed cycle and is actuated at the completion of the forward stroke or during the return stroke of the feed grippers. For more data circle 124 on Reader Service Card



Overall view of "Sesco-Matic" Pressroom Unit

Want better Service on STAMPINGS? ...then count



A FEW PIECES

- at Experiment or Pilot Stage

NO DIES! Our machine cut method, applying custom-built slitters, cutters, saws, files and stock punches—PLUS special techniques and skills—produce these small quantities at very low cost.



SHORT RUNS

TEMPORARY LOW-COST TOOLING! To produce something more than a few, but less than high production quantities, our simple contour dies -PLUs special purpose presseskeep costs low.



HIGH RUNS

MODEST DIE CHARGES on larger quantities! Here is where our regular production tooling applies to advantage... to deliver high quantity Stampings, and at lowest possible unit

You can rely on it...we look at all 3 Stamping techniques, each our exclusive development...to determine the best method for fast, efficient, low-cost Service on any quantity—one to a million!

Free 12-page booklet shows how to save on stampings...write for it.



STAMPINGS DIVISION

317

3312 Union Street, Glenbrook, Conn. For more data circle 493 on Reader Service Card

December, 1956

modern machine shop

RADIUS DRESSER IS ACCURATE TO 0.0002 INCH

Somerset Tool Co., 320 Virginia St., Hillside, N. J., has announced a special large model dresser which is accurate to 0.0002 inch. Specially de-



View of Somerset "Giant" Radius Dresser

The STEVENS Line SINCE 1925 Introducing NEW series



ROTARY TABLES, 5-71/2-8-12-15-18-24" sizes both standard and dial indexing types ADJUSTABLE TILTING TABLES, #0-1-2 COMPOUND TABLES, #1-2 ROTARY-COMPOUND TABLES, #1-11/2-2 INDEX CENTERS-multiple spindle SPECIAL MACHINES—designed and built See your dealer or write for bulletins

The John B. Stevens Company Main Street, Somersville, Conn., U. S. A.

For more data circle 494 on Reader Service Card

signed for large surface grinders, the Somerset "Giant" Radius Dresser is said to quickly shape and dress large diameter grinding wheels either concave, convex or combinations of both. Extremely versatile, the "Giant" will equally perform the same accurate dressing operations on small bench surface grinders.

Designed to permit wide usage in every toolroom and surface grinding department, the dresser will quickly dress a 20 inch diameter wheel up to and including a 2 inch thickness. It is also adaptable for use on cylindrical grinders. Its operation is open and easy to see. There is no need to remove the abrasive wheel guard, as the wheel is dressed from below. Stop pins allow complete adjustment from 90 through 180 degrees. Diamond dressing points are easily set by measuring with a micrometer from top of measuring hood to bottom of dresser arm.

For more data circle 125 on Reader Service Card

SMALL saw with LARGE canacity

MODEL A-Capacity 6" x 11" with BIG machine features. Rugged construction. Precision saw guides. Adjustable cutting pressure and rate of descent. Quick action swivel vise. 1/2" blade. Rotary blade brush. Automatic blade shut-off. 1/2 H.P. motor with overload protection. Table available to use saw vertically for contouring, notching, and slotting!

Send for FREE CATALOG.

Dept. M.

W. F. Wells and Sons THREE RIVERS MICHIGAN Metal Cutting Band Saws

Model A

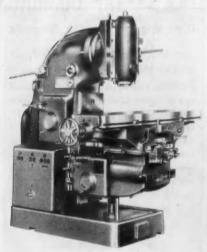


For more data circle 495 on Reader Service Card

MILLER FEATURES POWER RAPID TRAVERSE IN ALL DIRECTIONS

Maserati Corp. of America. Dept. M, Westbury, N. Y., has announced the addition of the Model No. 3 to its line of Horizontal and Vertical Milling Machines. Maserati Millers are built in Italy by Maserati Machine Works and are designed and calibrated specifically for the American market. Model No. 3 has the following specifications: table working surface, 59 by 13-25/32 inches: distance between table slots, 3.1495 inch: table swivel (universal), 45 degrees: spindle taper, 23/4 inches; minimum and maximum distance from center of spindle to top of table, 0 to 181/4 inches: distance between column and brace, 31% inches; and maximum diameter of cutter, 125/8 inches.

Maserati Millers feature power rapid traverses in all directions, dual automatic selection of speeds and feeds, dual controls for all power feeds and rapid traverse and for clutch and brake. For more data circle 126 on Reader Service Card





in 10 seconds with the

Now, in your own shop, on your present lathes. you can do such jobs as Milling, Slotting, Grinding, Grooving, Sawing

at angles, recessing and many more complicated jobs easily and quickly with the Palmgren Milling Attachment. Yes, in just 10 seconds you can convert to any of these operations and save time and money doing work you formerly had to send out. Precision built, graduated for rotary angle and vertical adjustments, easily mounted on all makes of lathes by straddling tool post, this attachment has proved highly valuable in thousands of shops, both large and small. Three sizes: jaw widths 11/2" \$18.75; 21/2" \$24.75; 4" \$39.75. Available NOW! Get more out of your lathes by using these Palmgren Milling attachments. Write today.

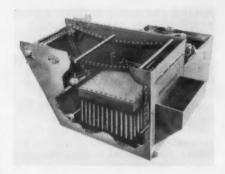
Just a few operations you can do on your lathe!



CHICAGO TOOL & ENGINEERING CO. Maserati Model No. 3 Milling Machine 8399 South Chicago Ave., Chicago 17, Illinois For more data circle 496 on Reader Service Card

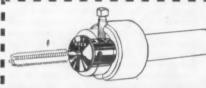
TUBULAR SCREEN TYPE FILTER REQUIRES SMALL FLOOR AREA

Designed for efficient filtration and maximum flow capacity of coolants, cutting oils and all liquids requiring removal of minute particles, Industrial Filtration Co., Dept. FM-294, 13 Industrial Ave., Lebanon, Ind., has developed the Delpark Filter-Matic Filter. Small diameter screen tubes are manifolded together into a common suction header, through which the sludge laden liquid is drawn by a special multiple chamber valve. It is then pumped into a filtered liquid compartment. As the screen deposits reduce the liquid flow through the screen tubes, the unfiltered liquid level begins to rise. At a predetermined level, a float actuates a switch controlling the multiple chamber valve, reversing the



Cutaway view of Delpark Filter-Matic Filter

flow of the liquid. The reversed flow backwashes accumulated deposits from the screens. As the reverse flow of clean liquid causes the unfiltered liquid to continue its rise, the float again reverses the flow of the liquid through the valve, returning to the filtering cycle. Sludge removed from the screen





BYGO TAP BUSHINGS

Give Higher Quality Threads

...Less Tap Breakage

BYCO tap bushings have a square broached end to fit and drive all standard taps from No. 0 to 1%" and pipe taps from ½" to 1". Eushings are available in five o.d. sizes to fit ½, ¾, 1, 1¼ and 1½ in. tap holders. Chrome hardened for long life. Self-cen-

tering screws on each side of bushing lock tap securely and assure absolute true positioning.

Write today for Bulletin MS

BYCO INDUSTRIES

2200 SNELLING AVE.
MINNEAPOLIS 4, MINN.

For more data circle 497 on Reader Service Card

tubes drops to the bottom of the filter compartment where it is removed by chain driven dragout flights.

When precoat is used, an automatic measuring device, with a vibrating mechanism to prevent bridging of the precoat material, is mounted above the filter inlet and automatically feeds a predetermined amount of precoat material at each backwash period. This precoat feeding device is actuated by the air cylinder feed which operates the multiple chamber valve. This automatically adds new precoat as old precoat is backwashed from the tubes.

For more data circle 127 on Reader Service Card



View of Kendex Indexable Carbide Insert Tool

dex tool, which has been developed by Kennametal, Inc., Latrobe, Pa. Kendex "turn-over" carbide button inserts only ½ inch square are claimed to provide one of the most economical and efficient cutting operations available from carbide materials. An increase in the efficiency of this operation is said to be possible because only the middle of the chamfering insert is used, thus permitting exchange of the two inserts when each has been used in eight positions. For more data circle 128 on Reader Service Card

FACING AND CHAMFERING TOOL

Sixteen indexable cutting edges per button insert for facing and chamfering in a single operation are now available when using the two-in-one Ken-

For second operation and lathe work, in the grinding room, tool room, etc.

These stops have simple, self-centering neoprene rubber o-ring mounts. All friction lock, no thread adjustment, quick changing.

Will not distort collet, will stay in fixed position, will not move back, cuts scrap costs.

Also available for other collets and spindles.

Write today for Bulletin MS.

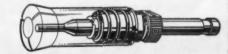
BYCO INDUSTRIES
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New Self-Centering



5C COLLET STOPS

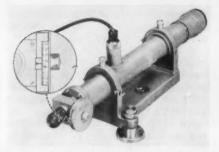
With Quick Friction Adjustment



For more data circle 498 on Reader Service Card

COLLIMATOR PERMITS DIRECT READING TO 0.1 SECOND OF ARC

Engis Equipment Co., 431 South Dearborn St., Chicago, Ill., has announced that the Watts Microptic Auto-Collimator has recently been improved by a new micrometer drum arrangement, as shown in the accompanying illustration, that permits direct



View of Watts Microptic Auto - Collimator equipped with micrometer drum arrangement

CENTERLESS GRINDING

Brown & Sharpe and Swiss Automatic screw machine parts, aircraft and standard, heat treated and ground if necessary. Send blue prints for estimates. 27 years serving industry. The Porter Machine Co., Cincinnati 9, Ohio.

For more data circle 499 on Reader Service Card



WALTER

PRECISION DIVIDING ROTARY TABLES

- With & Without Dividing Discs
- . READABILITY: 6 SECONDS.
- . CONSTRUCTED FOR LONG LIFE.
- . MAINTAIN PRECISION.
- AVAILABLE IN 10", 121/1", 151/4", 191/4", 25", 31".

 Also many types of Universal Precision Dividing Heads and Attachments for most economical production.

Test reports furnished with literature. Sole Agents:

NEISE ADDERNTOOIS

KARL A. NEISE 404 4th Ave., Dept. MMS, New York 16, N. Y.

For more data circle 500 on Reader Service Card

reading to 0.1 second of arc-equivalet to one-half millionth of an inch per inch in length. According to the manufacturer, the optical system, as well as its mounting, provides increased stability with great accuracy and high sensitivity; further improvements have been made in illumination and electrical equipment.

The Watts Microptic Auto-Collimator is claimed to be finding increased recognition as the universal instrument wherever engineering tests have to be performed with optics. The applications range from the testing of surface plates and machine tools to the control of ultra-precision gear cutting devices, test fixtures and tables for missile guidance units; they even cover the testing of the finest wires for diameter and roundness.

For more data circle 129 on Reader Service Card

HARGRAVE CLAMPS

A Complete Line of Clamps for all Purposes

Individually **Power Tested** for Better Performance.



"C", Steel Bar, Quick Acting, Wood Hand Screws, Welders

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Showing Clamps, Chisels, Punches, Masonry Drills Washer Cuth'rs, and File Cleaners.
Stocked by Your Local Distributor.

THE CINCINNATI TOOL COMPANY

1947 Waverly Ave., Cincinnati 12, Ohio

For more data circle 501 on Reader Service Card

PORTABLE COIL HANDLER

Benchmaster Manufacturing Co., 1835 West Rosecrans, Gardena, Calif., has announced an improved Koil Kradle for supplying coil stock to presses and other equipment. The Koil Kradle is equipped with casters, enabling it to be moved easily from machine to machine, as needed, and also facilitating alignment of Koil Kradle to machine. It is available in capacities from 1,200 to 16,000 lb., handling coils up to 48 inches wide by 60 inches in diameter.

Front wheels of the portable model swivel for steering. As the tongue is lowered, the bed is lifted by a cam, clearing the floor ½ inch. With the tongue in vertical position, front of the bed is lowered to set solidly on the floor.

The Benchmaster Koil Kradle



Benchmaster Koil Kradle with pinch roll unit

shown in the accompanying illustration is equipped with a pinch roll unit. The casters, however, can be supplied on the Koil Kradle alone or on Koil Kradle-Roll Straightener Combination. For more data circle 130 on Reader Service Card



Write for catalog sheet and complete details.

BEVERLY SHEAR MANUFACTURING CO.

For more data circle 502 on Reader Service Card

ADDITIONS TO WRENCH LINE

J. H. Williams & Co., 410 Vulcan St., Buffalo 7, N. Y., has extended the range of opening sizes of its 15 to 75 degree Midget Superrenches to include 9/16 and 5/8 inch sizes. The line now carries



View of J. H. Williams Midget Superrench

13 sizes with openings from 3/16 to 5% inches. Both heads have the same opening size. According to the manufacturer, these wrenches are unusually thin and slim, but surprisingly tough and strong. They are valuable on delicate adjustments and in the closest of quarters. They are drop-forged from selected alloy steel, heat-treated and finished in chrome-plate over nickel.

For more data circle 131 on Reader Service Card

Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS

Simply insert in holes, invert, strike sharply and



you have centers and drill circles perfectly located. Reduce time and ellminate spoilage of other methods. 8 sizes, from 3/16" to 3/4" U.S.S. Inexpensive — Last for years.

Write for Circular NIELSEN TOOL & DIE COMPANY P. O. Box 1067 Berkley, Mich.

For more data circle 503 on Reader Service Card

- - -

OPTICAL TORQUE TESTER

The P. A. Sturtevant Co., Addison, Ill., has announced its precision torque tester, which features a torsional shaft measuring element that is submerged in preheated oil which is said to enable constant operating temperatures for the measuring device. There is no mechanical connection between the measuring element and the indicating pointer, as the pointer is projected onto the scale through an optic system. The indicating pointer, as it appears on the television-type screen, travels across a ribbon scale for a distance in excess of



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CHICAGO GEAR WORKS
440-50 N. Oakley Bivd., Chicago 12, III.

For more data circle 504 on Reader Service Card



For more data circle 505 on Reader Service Card

10 feet in total length. The indicating pointer is a shadow image and, therefore, there is no parallax error when an operator views the screen. Correct readings can be made from either extreme side of this tester, as well as from a perpendicular view.

Another feature of this optical torque tester is the fact that it is equipped with a power loading device. The manufacturer claims that the operator will no longer be confronted with the fatigue of hand loading torque wrenches or the long delaying process of loading with hand-operated mechanical devices. It is reported that a torque wrench can be tested to full capacity in just seconds, or it can be checked over each increment marking on the full scale range of the torque wrench rapidly and with extreme accuracy. The loading arm is operated by an air-hydraulic system, and the movement of the loading arm can be controlled with a metering valve so that it will move



Sturtevant Precision Optical Torque Tester

FOR FASTER PRODUCTION

THE ELLIS

DIVIDING HEAD

Although it is built to fine instrument standards, the ELLIS is a really rugged tool room or production tool that's designed for unusual versatility. Its universal motions — swiveling in two planes — will save time and increase profits and accuracy on your millers, grinders, drill presses and jig borers. It has 6½" swing, or 11" swing when used with riser blocks. Work may be held between centers, or in chucks or collets. To save rehandling of work, and to save money, investigate the ELLIS by writing for complete details!



76-H MAMARONECK AVE. WHITE PLAINS, N. Y.

For more data circle 506 on Reader Service Card

modern machine shop

325

as slowly as the hands on a clock or as rapidly as need be to load any type of torque wrench to full capacity almost instantly.

According to the manufacturer, reflex or sensory signalling torque wrenches, which release momentarily at the handle of the tool, may be tested as easily as the direct reading models.

The impact, or momentary snap action which is very strong on some signalling tools, such as those with a cam or toggle device, is said to have no effect on the permanent accuracy of this tester and causes no wear or damage. since the indicating pointer is projected optically rather than through mechanical linkages.

Provision is made on the heavy gauge metal cabinet of the optical torque tester to permit mounting special ex-

ternal fixtures for miscellaneous production and laboratory tests. The illustration shows the addition of a power operated mechanism that enables the checking and setting of mechanical time fuses.

These optical torque testers are available in three capacity ranges: OTT 250-I, range scale, 1, 0 to 250 inch-pounds, range scale 2, 0 to 4.000 inch-ounces: OTT 165, range scale, 1, 0 to 165 foot-pounds, range scale 2, 0 to 1,980 inchpounds; OTT 500. range scale, 1, 0 to 500 foot-pounds, range scale 2, 0 to 6,000 inch-pounds. According to the manufacturer. there are no special requirements for installation of the torque testers.

For more data circle 132 on Reader Service Card



CHAMFERING TOOLS

Wesson Co., 1220 Woodward Heights Blvd., Detroit 20, Mich., recently announced that two new holder styles. designed for 30 and 45 degree chamfering operations, have been added to its line of standard Multicut holders for throw-away carbide inserts. The holders offer high versatility, being applicable also to straight turning, plunge feed turning and facing operations. The 30 degree lead angle style, designated as the TDRC-TDLC, is also suitable for 90 degree shoulder turning by angling the holder in the tool block. The 45 degree lead angle holder style is designated as the SERC-SELC.

Both holders incorporate standard replaceable parts, including a one-piece insert seat and locator, adjustable carbide faced chip breaker-clamp, and locking screw. The TDRC-TDLC employs standard triangular "No-grind" inserts, while the SERC-SELC are de-



Wesson "No-grind" Multicut Chamfering Tool

signed for use of standard inserts which provide a total of eight cutting edges before discarding.

These holders offer the same advantages as all standard "No-grind" Multicuts employing throw-away inserts such as elimination of grinding and rapid insert indexing for reduced tool change time. Rigidity and positive chip control are provided by adjustment and locking of the chip breaker-clamp on serrations.

The large clearances provided in the

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Finding a place for production parts can be inconvenient and time consuming when boxes are unavailable.



For the best steel stacking box, its Sterling—its top rim construction makes it best.

Sterling makes all types and sizes of steel boxes.

STERLING FACTORY EQUIP. CO. 183 Charles St., Providence, R. I.



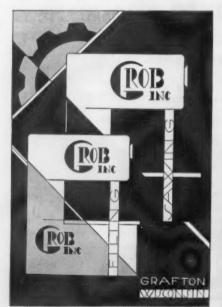


For more data circle 508 on Reader Service Card

design of these holders are claimed to make them especially suited for "gang" setups. At the same time, they may be used in any position, since insert indexing is facilitated by top or bottom adjustment of the locking screw.

For more data circle 133 on Reader Service Card





For more data circle 510 on Reader Service Card

STANDARD PRECISION LATHE FOR TURNING AND GENERAL TOOLROOM WORK

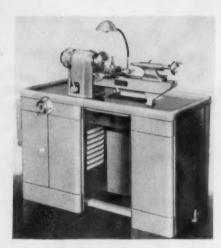
Announcement has been made by The Wade Tool Co., Waltham, Mass., that a new Model No. 73 Standard Precision Lathe is now available. It was stated that this precision bench lathe is the last word in a machine designed for turning and general toolroom work—wherever a precision bench lathe is required.

According to the manufacturer, this lathe is built with hardened and ground bed, totally enclosed headstock of 1 inch collet capacity and a 7 inch swing. The lathe headstock spindle is equipped with preloaded anti-friction staggered cylindrical roller and ball bearings. Standard equipment consists of draw-in bar, offset-type tailstock with hardened and ground full bearing spindle, hand rest, dog face plate. centers and center collet. It also comes equipped with compound slide rest, with large diameter acme threads in long bronze nuts, micrometer dials being graduated in thousandths of an inch.

The variable speed drive, which is standard with this precision lathe, is totally enclosed in the attractive pedestal cabinet. The manufacturer states that this drive gives an infinite range of spindle speeds from 100 to 3,500 r.p.m., in overall ratio of 35 to 1. It



For more data circle 511 on Reader Service Card



View of Wade No. 73 Standard Precision Lathe

has a single lever control designed for the purpose of stopping and starting the machine headstock spindle. The

mechanical reverse gives a high-low spindle speed in ratio of 5 to 1. For more data circle 134 on Reader Service Card

DISC FILING MACHINE EASILY REMOVES METAL ON ANY ANGLE OR RADII

A product of Jersey Manufacturing Co., 442 Livingston St., Elizabeth, N. J., the Jemco Disc Filing Machine has been designed for quick and accurate removal of metal-ferrous or non-ferrous-wood and plastics. The Jemco Disc Filing Machine may be equipped with two discs at one time ranging in size from 31/8 to 18 inches. Filing discs are available in many different cuts suitable for type work to be performed. For cutting non-ferrous metals, discs are available in carbon steel. For ferrous metals, discs of high-speed steel



clusive design of mechanism are of Major Importance and ONLY found in "MASTER COMPAR."



Ask for Illustrated Circular - Code GIOFF

Sold thru Tool Supply Houses Ask for Demonstration

Release button for movable Anvils on RIGHT Hand side enables you to hold tool the conventional way.

NEW - Resetting to Zero in 5 seconds

Quick adjustable tolerance hands. Heavy TUNGSTEN CARBIDE Anvils will actually measure Out-of-Roundness, Ovalness and Taper.

YORK 12, N.Y.

COMPLETE LINE OF PRECISION INSTRUMENTS

For more data circle 512 on Reader Service Card

December, 1956

modern machine shop

329

and carbide may be obtained. All discs come with ground teeth which may be resharpened by grinding when dull.

The versatile work table of the machine provides for mounting fixtures or special sliding tables for special operations. It is claimed that deburing op-



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RADIUS DRESSER

eutperforms them all
Cut production time
without sacrificing accuracy! Easy to set, easy
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into routine operations.

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SOMERSET TOOL CO.

320 Virginia St. Hillside, N. J.

For more data circle 513 on Reader Service Card



View showing Jemco Disc Filing Machine

erations can be accomplished in record time and require negligible handling.

The Jemco Disc Filing Machine is powered by a 1 h.p. motor which turns discs at five standard speeds: 175, 250, 310, 370 and 410 r.p.m. Additional speeds may be achieved by changing pulleys. Overall dimensions are 32 inches high by 28 inches wide and the weight is 510 lb.

For more data circle 135 on Reader Service Card



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THE GRANT MFG. & MACHINE CO. 96 Silliman Ave. Bridgeport 5, Conn.

For more data circle 514 on Reader Service Card

MUMMERT-DIXON SWING FRAME GRINDERS

Sizes 12", 14", 16", 18", 20" and 24" wheels.



Ask for Descriptive Circular

MUMMERT - DIXON CO.

120 Philadelphia St. Hanover, Pa.

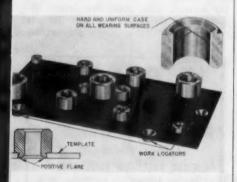
For more data circle 515 on Reader Service Card

DRILL BUSHING FEATURES EASE OF INSTALLATION

Designed to reduce tooling costs, Techno-Products Corp., 143 Netherwood Dr., Springfield, Pa., has developed the Flar-A-Lock Drill Bushing. which is easily and quickly installed in light gauge template material with the use of only a hammer and a hand flaring tool. A selective heat-treating process case hardens the wearing surfaces to C63-C65 Rockwell hardness. vet the shank lip remains malleable to permit flaring with the hand tools. This action is said to produce a positive lock on the template, thereby assuring concentricity of the bushing within the template hole and true perpendicularity to the plane of the template. The design principle facilitates clustered installations, overcoming the difficulties commonly encountered in concentrated hole patterns.

When holes must be relocated, the bushing is quickly and easily removed by drilling the flared shank from the under side of the template. Manufactured in two shank sizes for installation in either 1/16 or ½ inch aluminum or steel sheet, the bushing covers all standard drill sizes from No. 54 to ½ inch diameter.

For more data circle 136 on Reader Service Card



View showing the Flar-A-Lock Drill Bushings

STOP WASTING DRILLS

NEW LIFE for OLD DRILLS with BLACK DIAMOND DRILL GRINDER

FOR DRILLS UP TO 34"

The BLACK DIAMOND Drill Grinder restores an old drill to like-new precision sharpness . . . in 10

seconds! Any inexperienced man
(or woman!)
is an expert
grinder with
this unit.
Both lips
ground at
once... web-



thinning equally simplet Pays for itself



The WORCESTER Drill
Grinder (now manufactured by Black
Diamond) sharpens 2,
3, or 4-lip drills, flat, flat twisted or chucking, up to 2½". Clearances are easily and instantly changeable, feeding is controlled by micrometer adjustment

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SAW & MACHINE WORKS

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For more data circle 516 on Reader Service Card

NAILS DESIGNED FOR HARNESS BOARD WIRING APPLICATIONS

John Hassall, Inc., Westbury, N. Y., has announced a new line of nails, designed specifically for harness board wiring applications. In addition to hav-



For more data circle 517 on Reader Service Card



For more data circle 518 on Reader Service Card

modern machine shop

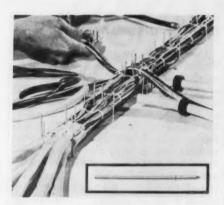
& MFG. CO.

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CHICAGO 19

1114 E. 87TH ST.

332



View showing typical electronic application of Hassall Harness Board Wiring Nails

ing extensive applications in the electric and electronic fields, it is said that the nails will find broad usage in the aircraft and guided missile industries; in wiring machine-tool control panels; for instrument and control wiring and for switchboard wiring; in short, wherever multiple circuits are preassembled prior to installation within the main piece of equipment.

The nails, or posts, have a collartype stop % inch from the pointed end to prevent them from being driven in too far. The collar also acts as a guide in assuring that they will be driven in far enough. The posts are driven directly into the board without the aid of predrilled holes. Tops are milled

CAMS

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For more data circle 519 on Reader Service Card

December, 1956

round to facilitate slipping wires on and off the harness. Nails are made of cadmium-plated steel and are available from stock in above-collar lengths of 1, 1½, 2, 2½ and 3 inches.

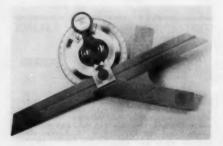
A typical electronic application is shown in the accompanying illustration. The nails are being utilized as harness board posts to hold the assembled wires in place according to the circuit diagram laid out on the board. For more data circle 137 on Reader Service Card



PROTRACTOR FEATURES ADJUSTABLE MAGNIFIER

George Scherr Co., 200-MM Lafavette St., New York 12, N. Y., has added an adjustable magnifier to its Universal Vernier Bevel Protractor. To eliminate glare, the measuring dial of the protractor is "Lustro-Chrome" finished, which is said to protect the surface from rust and corrosion. Thus. readings can be taken quickly and efficiently without eyestrain, thereby saving time. The tool is claimed to measure any angle to five minutes, and comes regularly with 6 inch blade. Additional accessories available are blades in 8 and 12 inch lengths, acute angle attachment and a stand.

For more data circle 138 on Reader Service Card



View of Scherr Universal Vernier Bevel Protractor equipped with adjustable magnifier

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Extra Long, Straight Shank High Speed Drills

12" OA,	9"	FLUTE
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SIZE	PRICE	SIZE	PRICE
1/8 9/64 5/32 11/64 13/64 7/32 15/64 1/4 17/64 9/32 19/64 5/16 21/64 11/32 3/64 3/8 25/64 13/32	1.65 1.75 1.85 1.85 1.95 2.05 2.05 2.15 2.25 2.25 2.25 2.50 2.75 2.75 3.05	27/64 7/16 29/64 15/32 31/64 1/2 33/64 9/16 37/64 19/32 39/64 5/8 21/32 11/16 23/32 3/4	3,30 3,30 3,60 3,60 3,60 4,20 4,50 4,75 4,75 5,00 5,00 5,80 6,25 6,75

18" OA. 131/2"-14" FLUTE

SIZE	PRICE	SIZE	PRICE
3/16	4.00	9/16	8.75
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5/16	4.75 5.25	21/32 43/64	11.00
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For more data circle 520 on Reader Service Card

GRANITE SURFACE PLATES

Benjamin Horowitz Monument Works, Inc., 33 Second Ave., New York 3, N. Y., has recently announced its ability to offer machine shops the services of its craftsmen, combined with



View of Horowitz Granite Surface Plate

modern precision cutting and polishing tools for the manufacture of fine service plates. The granite surface plates are warp-free, rust-free, non-magnetic, long-lasting and are guaranteed to the accuracy of 0.00005 inch on plates up to 24 by 36 inches. In addition, these granite surface plates are suction-free, non-abrasive and temperature resistant. For more data circle 139 on Reader Service Card



UP-TO-DATE TOOL CO.
P. O. Box 99, Station A, Worcester 8, Mass.

TRUE POINT

For more data circle 521 on Reader Service Card



VARIABLE-SPEED BAND SAW IS SMALL BUT POWERFUL

The Tannewitz Works, Grand Rapids, Mich., recently placed on the market a small, but powerful variable-speed band saw, which is designated as the "EV-24." The band saw has wheels 24 inches in diameter and can be operated at any speed from 300 to 6,000 r.p.m. Consequently, it is claimed that this saw can readily be adapt-



ONE tool holder for all positions . . . No tool chatter . . . can do internal boring or internal threading . . . Ideal for carbide tools . . .

Bit sizes: 1/4", 1/4", 1/4", 7/16", 1/2", 1/4"

Furnished with Cobalt Bits

ACME TOOL CO.

73 W. Broadway New York 7, N. Y.

TEMPERATURES AT A GLANCE

PYRO SURFACE PYROMETER

Quick-acting, lightweight and rugged...unsurpassed in accuracy. Large direct reading scale, automatic cold-end compensator, shielded steel housing. Wide selection of thermocouples and extension arms. Five standard ranges: 0-300° F. to 1200° F.; also special and sub-zero ranges. Write for free Catalog No. 163.

THE PYROMETER INSTRUMENT CO. Bergenfield 42, New Jersey

For more data circle 523 on Reader Service Card

December, 1956

ed to any kind of sawing, whether wood or metal. At the low speeds it will saw light cast iron, bronze or cast brass. At the intermediate speeds it is claimed to saw standard bronze, yellow brass, aluminum, magnesium and so on. At the higher speeds this saw is said to be capable of sawing any sheet metal, whether steel, brass or aluminum, either formed or flat, and in the latter case, several sheets at a time.

This band saw has a 24 by 28 inch table, machined for all desirable gauges, which may be tilted and locked at any angle from 15 degrees left to 45 degrees right. It is motor driven and equipped with pushbutton controls and overload and low voltage protection. It has a heavy cast frame, fully enclosed, carefully balanced wheels, quick acting foot brake, roller guide supports, a guard which makes it possible to cover the saw blade above the guide at all times.

For more data circle 140 on Reader Service Card



Tannewitz "EV-24" Variable-Speed Band Saw



111 Brayton St.

modern machine shop

For more data circle 524 on Reader Service Card

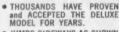
Buffalo, N. Y.

335

.0003 HOLE LOCATION

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 JUMPS SIDEWAYS AS SHOWN WHEN LOCATION IS REACHED

←NEW .500 DIA. MODEL FOR LARGER WORK ONLY. .200



ADJUSTABLE VISE STOP

\$2.95



HUNDREDS OF PIECES TO A .0003 TOLERANCE WITH THIS HARDENED VISE STOP THAT IS ADJUSTABLE IN ALL DIRECTIONS.

ATTACH TO VISE WITH ONE 1/4-20 TAPED HOLE.

Dealer Inquiries Invited

GLOVER MFG. CO.

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Meadville, Penna.

For more data circle 525 on Reader Service Card



DIRECT INDEXING

Optional SWIVEL BASE converts a conventional dividing head into a universal work head or rotary table. Change-over is accomplished in seconds without tools or wrenches.

Also available in 10" - 12" sizes and in 10" - 12" spiral drive.

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CARROLL DIVIDING HEAD CO.

3525 Cardiff Ave.

Cincinnati, Ohio

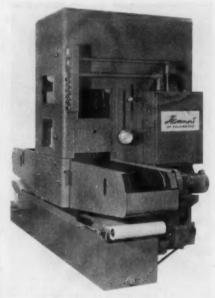
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336 modern machine shop

new shop equipment . . .

ABRASIVE BELT FINISHING MACHINE

Hammond Machinery Builders. Inc., 1618 Douglas Ave., Kalamazoo, Mich., has announced its Model FF-12 Flat Finisher, which is designed for wet abrasive belt grinding, polishing and deburring of flat work such as sheets, strip, bars, stampings, plates and so on up to 12 inches wide and 6 inches high. According to the manufacturer, continuous feeding of the work is accomplished through the use of a variable speed air-tensioned endless conveyor, placing this machine in the "high production" class. The head of the machine is of the two roll design, employing an abrasive belt 12 inches wide by 126 inches long. It consists of a large diameter air-tensioned



Hammond 12 Inch Model F-12 Flat Finisher

tracking idler pulley, a heavy dovetail slide for work height adjustment and a contact roll driven by up to a 25 h.p. motor.

Other features and optional equipment include power elevation for head adjustment to the work, 6 to 10 inch diameter contact rolls, adjustable work hold down rolls, magnetic conveyor platen and automatic coolant filter.

For more data circle 141 on Reader Service Card



Rotodex Precision Rotary Indexing Table

combine precision and speed with unusual accuracy.

The new type indexing attachment of the Rotodex is said to minimize loss of time and material in mass production. According to the manufacturer, the indexing attachment eliminates the possibility of miscounting turns and the incorrect reading of dials, due to eye fatigue and interruptions. In a 10 inch circle, the angle accuracy between one division and the next is said to be accurate within three ten thousandths inch, total angular indicator. For more data circle 142 on Reader Service Card

ROTARY INDEXING TABLE COMBINES SPEED WITH ACCURACY

The Genevamatic Engineering Co., 412 East Ellamae, Tampa, Florida, has announced its super high precision, fool-proof indexing rotary table, called the Rotodex. Simple to operate, this rotary indexing table is said to



For more data circle 527 on Reader Service Card



Specializing in Stainless Steel
Standard and Made to Order Precision Parts
Send Your Blueprints for Prompt Quotations

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For more data circle 528 on Reader Service Card

- MICROMETERS

MADE STRONGER to LAST LONGER

the new, modernized Slocomb Micrometer has 14 exclusive features that mean greater accuracy and longer wear. New non-glare satin chrome finish on thimble and sleeve. Over 700 different models.

Quick repair and reconditioning service.

FREE LITERATURE AVAILABLE.

J. T. SLOCOMB CO. Glastonbury, Conn.

For more data circle 529 on Reader Service Card

new shop equipment . . .

AIR POWER NOTCHER AND PUNCH PERFORMS MULTITUDE OF JOBS

A rugged new Air Power Notching and Punching Machine, designed to streamline operations in sheet metal shops and metalworking plants, has been introduced by Niagara Machine and Tool Works, Buffalo 11, N. Y. With 61/2 ton capacity and 43/4 inch throat, this versatile machine can be equipped with a large selection of punches and dies for simple or intricate holes, corner trimming or combination trimming and cutoff. A foot valve frees both hands for locating and feeding the material. The ram can be lowered gradually, to locate work at prick-punched points and to facilitate



View of Niagara Air Power Notcher and Punch

338 modern machine shop

December, 1956

die changing. The throat permits notching and punching well inside edge of sheet

A special duplex setup, with two machines mounted on a single stand for edge or corner notching, facilitates the fabrication of drums, pails, pans and similar objects. A single foot valve operates both machines simultaneously.

Other optional equipment includes floor stand; feed table with adjustable squaring edge, particularly advantageous when handling large sheets; and a wide variety of notching and punching attachments. The machine operates on shop pressure of 80 p.s.i.

For more data circle 143 on Reader Service Card



CARBIDE TIPPED DRILLS

Development of a new series of carbide tipped drills designed specifically for fast, efficient drilling in cast iron has been announced by Ace Drill



View of Ace Series 333 Carbide Tipped Drill

Corp., Adrain, Mich. The drills, designated Series 333, are manufactured with a special fluting, heavy web and slow spiral to provide great tool strength and rigidity. The combination of a uniformly hardened ground-fromthe-solid high-speed steel drill body and a selected high grade tungsten carbide tip provides a drill that cuts cleanly, ejects chips readily and resists wear on the cutting edge. In addition, these drills feature a specially designed point which facilitates fast. easy penetration of the work.

Series 333 drills are stocked by 64ths in the 1/8 to 1/2 inch diameter range and they will be made to standard iobber lengths.

For more data circle 144 on Reader Service Card

MARK





MECHANICAL PRESS FEATURES TWO SLIDE DESIGN

Two special 100 ton mechanical presses were recently designed and built by Danly Machine Specialties, Inc., 2100 South Laramie Ave., Chi-

Try this Allman Universal Hand Tapper FREE for 15 days—

Results have proved that once this tapper is in your shop or tool-room and you find 70% of your free hand tapping time saved—
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View of Danly 100 Ton Mechanical Press

cago 50, Ill. Designated as Dual Slide Extruding Machines, they feature two slides for exerting horizontal pressures required to extrude piston pins approximately 31/4 inches long for truck engines.

Each press is completely automatic. The net productive capacity of each of these presses is approximately 2,500 pieces hourly. An attached hopper supplies short lengths of bar stock to the feeding mechanism for extruding to size, including inside diameter and length.

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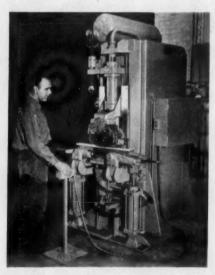
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HYDRAULIC TUBE BENDING PRESS

A vertical ram-type tube bending press, said to be capable of making two different angles in the same "U" frame, has been announced by Pines Engineering Co., Inc., 644 Walnut, Aurora, Ill. This Model 6-T Press incorporates a self-contained hydraulic system built for continuous production. It has a rated capacity of 6 tons and is designed so that the full ram tonnage is available for the bending action. This is claimed to be possible because the center clamp moves with the ram and the cushion pressure does not oppose the ram tonnage.

Other design features include twin equalizing cushion cylinders, variable speeds, single adjustment for wing dies, retracting ram dies and changeable wedge inserts for ram dies.

The press may be used for bending both steel or non-ferrous tubing. It has adequate power and capacity for continuous bending of 1 inch o.d. steel



Pines Vertical Ram-Type Tube Bending Press



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tubing with a minimum ovalization in the bend. Excessive flattening and wrinkling is said to be prevented by the operating characteristics of the machine. Provisions have been made for accurately aligning dies, and the wing die moves with the tube as it is wrapped around the ram die, eliminating the possibility of draw marks.

Included in the list of features of this press is an adjustable ram stroke. sturdy welded stress-relieved steel framework with pump, motor and electrical system mounted for easy accessibility, inspection and maintenance. The compact design and built-in features conserve floor space. The oil reservoir is ample for continuous efficient production and is provided with an oil cooler. Power is provided by a Vickers pump. Alemite grease fittings are located on the ram slide ways. wing holder spindles and crank pins. The press is supplied with all necessarv motors, motor starters and controls for operation on 220-440 volt, three-phase, 60 cycle current. Control circuits operate on 110 volt, 60 cycle with step down from line voltage through a transformer.

For more data circle 146 on Reader Service Card

LIGHTWEIGHT PORTABLE ABRASIVE BELT UNIT

An improved Portable Abrasive Belt Unit has been announced by The Grinding & Polishing Machinery Corp., 2530 Winthrop Ave., Indianapolis 5, Ind. The G&P 3-36 is a lightweight (6¾ lb.) hand tool that fits nicely into a classification between hand filing and large portable wheel grinders. Tool design is said to permit grinding on con-

LAWTON,

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G&P Portable Type Abrasive Belt Unit in use

tact wheel and on the platen or slack of belt for convex surfaces. Handle positions may be changed quickly and easily to accommodate job requirements and operator preference to reduce fatigue.

This air-motor operated tool will develop a speed of 4,700 s.f.p.m. and is claimed to be capable of doing in minutes the jobs that formerly took tedious hours of hand filing. This portable

abrasive belt unit is ideal for occasional jobs as well as for production work of various types.

For more data circle 147 on Reader Service Card

* * *

EMULSION CLEANER DESIGNED FOR EASY REMOVAL OF OILS, GREASES AND SOILS

The Mitchell-Bradford Chemical Co., Wampus Lane, Milford, Conn., has introduced its Emulsion Cleaner No. 26, which is a cold organic emulsion cleaner to be used for removing heavy oils, greases, dirt and so on from metals. This heavy-duty cleaner with penetrating, wetting and emulsifying powers is claimed to quickly loosen and emulsify oil, grease or soil and leave the surface clean for subsequent operations.

Emulsion Cleaner No. 26 is a gen-

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eral utility cleaner, which is claimed to reduce cleaning time when used prior to an alkali cleaner. Furthermore, it softens grease and grime for easy removal with a cold water rinse. According to the manufacturer, this

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For more data circle 148 on Reader Service Card

* * *

TURRET DRILLING MACHINE FOR JET AIRCRAFT ENGINE INDUSTRY

Howe and Fant, Inc., 20 Fitch St., East Norwalk, Conn., recently announced its Model A-50 Turret Drilling Machine, which has been designed specifically to accommodate the needs of the jet aircraft engine industry for performing consecutive drilling, reaming, counterboring and tapping operations in large circular patterns. It is claimed that all of these operations are accomplished with speed and precision in one handling of the work.

The large circular table of the machine accommodates rotary fixtures up to 48 inches in diameter. It is equipped with a complete coolant system, requires a minimum of floor space and permits the operator to work in a conventional position. The turret of the machine carries six spindles which work on a common axis and are indexed into position as required. Speed, depth and reversals for tapping are preset for each spindle and repeat au-



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tomatically as the turret of the ma-

The workpiece is loaded in a rotary fixture and indexed from one hole location to another; all necessary operations being performed at each hole location by indexing the turret. This procedure is claimed to minimize handling time and produce high quality work.

The quill, which carries the turret, is counterbalanced for extreme sensitivity and provides six inches of travel. The head of the machine is separately counterbalanced and adjustable through 15 inches of travel to readily suit the operator's convenience and the size of the job.

In addition to applications in the jet aircraft industry, it is anticipated that this machine will readily fill needs in

the turbine, blower, pump and generator industries.

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Howe and Fant Turret Drilling Machine



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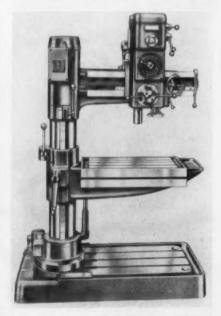
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new shop equipment . . .

RADIAL DRILL FEATURES EASE OF HANDLING

The Starrett Precision-Built Radial Drill, Model L-2, has been introduced by Aaron Machinery Co., Inc., 45 Crosby St., New York 12, N. Y. According to the manufacturer, the drill has been designed to most modern conceptions; every detail has been built in such a way as to give the greatest ease of handling and reliability when working. The use of first class materials in all parts liable to wear is said to assure a long life under the best working conditions and a high output.

The base is generously proportioned, being built in closed box form and is strengthened by several webs. There is a built-in coolant liquid collection chan-



View of Starrett Model L-2 Radial Drill

nel which takes the liquid to a suds sump at the bottom of the column where it is again put into circulation by the electro coolant pump. The column is of very strong construction, cast in a single piece, being webbed to give it maximum rigidity. It is further precision ground on the outside diameter on which slides the swing table. Swing arm is supported axially by a thrust bearing and is guided on the column by two bearings taking the radial stresses, this making the arm most sensitive to movement. The swing table slides and is very easily moved. The vertical table motion is obtained by use of a lever placed on the table itself. The table swings around the column, thus giving possibility of drilling very large jobs. It has a built-in coolant liquid channel which takes the liquid to the base through a telescopic tube. Three levers allow for the clamping of the head, swing arm and swing table.

SPECIAL MACHINE DRILLS, TAPS, REAMS AND DEBURRS

Ettco Tool and Machine Co., 598 Johnson Ave., Brooklyn 37, N. Y., recently announced the special Ettco-Emrick four-way drilling and tapping machine, shown in the accompanying illustration whereby every nine seconds, all at one time, ten holes are drilled, four deburred and two are tapped in an aluminum alloy (P-7083) diecasting.

The part is a plate-cast stator for the magneto of a small gasoline motor. In order to meet customer's production requirements of 400 completed pieces per hour, the manufacturer "Unit-Engineered" this multiple drilling and tapping machine, which consists basically of two of the company's standard vertical drill units (D. U. No. 2), one vertical automatic lead screw tapping unit (ATU No. 3) and one horizontal D. U. No. 2 drill unit.



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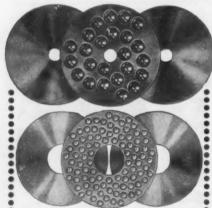
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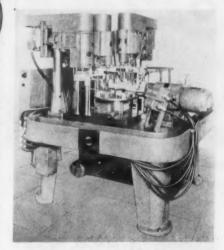
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These assemblies are mounted on a standard cast iron machine base with built-in coolant tank and pump. Electrical controls and wiring conform to J.I.C. standards. Tooling for the part consists of an eight-station No. 97 Ett-co-Emrick index table with eight nests to receive the part.

Operation of the special machine is simple. The operator unloads one part and reloads another in the load station over two locating pins. He then presses a button, which sends an electrical impulse to the index fixture. This indexes the loaded part to the work stations and also through a limit switch within the index, actuating the four units simultaneously to perform the necessary drilling, reaming, deburring and tapping operations. After the machining cycle has run its course to produce one completed part, all units automatically return to start position and the cycle is repeated.

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Ettco-Emrick Special Eight-Station Machine

348 modern machine shop

December, 1956

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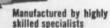
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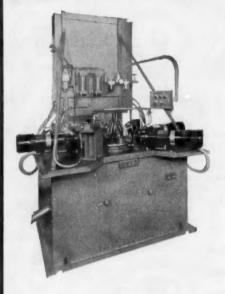
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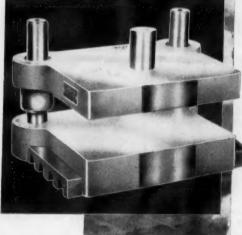
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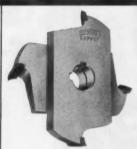
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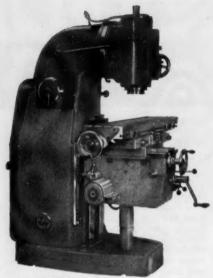
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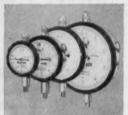
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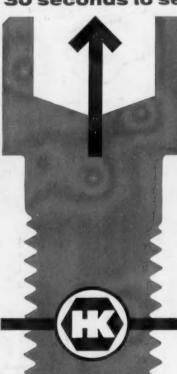
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